Radio Controlled
Soaring Digest
April 2017
Vol. 34, No. 4

CONTENTS

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Front cover: Taken during the 2017 Two Oceans Slope Soarers Aerobatic Event, Cape Town, South Africa. Ryan Matchett's Ceres exiting a manoeuvre with Lions Head in the background.

Back cover: *Petrel at Sunset*
"This was taken off 'A' mountain December 31, 2016. I was alone so it took some luck, controlling with my right hand and taking photo's with my left. No, the Petrel was not harmed during the photo shoot. — David Nutt, Arizona
Sony DSC-T110, ISO 80, 1/1000 sec., f3.5

R/C Soaring Digest

April 2017

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Managing Editors, Publishers — Bill & Bunny (B²) Kuhlman
Contributing Editor — Spencer Webster

Contact — bsquared@rcsoaringdigest.com
http://www.rcsoaringdigest.com
Yahoo! group: RCSoaringDigest
FaceBook: https://www.facebook.com/RCSoaringDigest

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In the Air

The RC soaring community has lost another member of its fold. Peter Abell, while absent from the RC soaring scene for some time, was an active competitor in a large number of events in Australia in the 1980s and 1990s and a participant in the 1987 F3B World Championships. In addition to being a top competitor, Peter also designed a winning 2 meter model, his Petre series. Peter is eulogized by Mike O'Reilly of the League of Silent Flight Australia on the opposite page. Following on page 6 is the description of the Petre III, the third model built in the Petre series, reprinted from the July 1984 edition of *RCSD*.

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From *Airflow*, Official Newsletter of the Model Aeronautical Association of Queensland, Inc. (Australia), October-December 2016, Editor's column, p.4

"There have been some new developments with F5J becomes an official FAI event on 1st January, 2017! No longer provisional - now a World Championships coming soon - start practising! The F5J Trophy event in Canberra, Picton Cup Rnd 2, Sailplane Expo and F5J at the NEFR (National Electric Flight Rally) have been logged for listing on the Slovakian leader board. The Trvana club in Slovakia, where F5J was born, have been asked by the FAI to prepare a brief for the First F5J World Championships in 2019! In the meantime, the World Cup run by the Trvana club each August continues. Next year, in 2017, they are offering three F5J events in close proximity in one week in August to make it worthwhile for overseas teams to attend. They are calling it the Slovak Triangle!!"

Time to build another sailplane!

B²

On Wednesday 1st March Peter died tragically in a swimming accident at Tuckers Rock near Urunga on the north coast of NSW.

It appears that Peter's two boys got caught in a rip and Peter went in after them, and the boys then walked out onto the beach. Unfortunately, Peter must have been too exhausted and his body was washed up on the beach some 25 minutes later. Some people on the beach tried to revive him with CPR but it was too late and he never revived.

He leaves behind his wife, Sue, and four children.

Peter had not been active in aeromodelling lately, but he was a fiercely competitive model glider pilot in the mid 80's to mid 90's. Peter had an uncanny ability to find thermals where no-one else could; perhaps his father Bruce's free flight background helped.

For a number of years Peter flew F3B models that were moulded in Sydney with Phil Bird and Alan Lowe. They were the gun F3B team in Australia at the time. Peter was a team helper with the Australian Team at the 1985 World Championships in Waikerie and then represented Australia at the F3B World Championships in Achmer, Germany in 1987. Peter shook up the European F3B veterans with his LB6 glider and aggressive flying style and was leading the competition into Round 5. Unfortunately a German summer rain shower caused a model malfunction and Peter's backup model wasn't as good. He went on to finish 12th.

Peter was very actively involved in LSF and ran several Jerilderie Tournaments whilst he was part of the LSF executive. He had outstanding competition success as the results below highlight (thanks to Des Bayliss). As a 3 times winner of Jerilderie Peter is in very select company.

1985/86	Nationals F3B 1st, Thermal 2nd
1987	6th World F3B Champs 12th, AUS 13th
1987/88	Nationals F3B 1st
1989	LSF Tournament 1st as a first timer
1990	LSF Tournament 7th
1990/91	Nationals F3B 1st
1991	LSF Tournament 34th
1992	LSF Tournament 6th
1992	AUS F3B Champs 9th
1993	LSF Tournament 1st
1993	AUS F3B Champs 1st
1993/94	Nationals F3B 1st, Thermal 2nd
1995	LSF Tournament 1st
1995	AUS F3B Champs 1st
1996	Easter LSF Tournament F3B 3rd to Daryl Perkins 1st and Nic Wright 2nd (both World Champions), Thermal 12th

Peter made a career as a Horticulturist and worked in the Botanic Gardens in Sydney for over 10 years. Just over a year ago he moved to Bellingen and became a supervisor for the Green Army based in Dorrigo. As such he managed revegetation and maintenance of the walking paths in Dorrigo National Park and New England National Park. He visited the 2016 Sailplane Expo last year and renewed acquaintances and spoke of a return to RC gliding.

We have lost a champion under tragic circumstances and our thoughts and best wishes go out to his family and close friends. Taken way too soon!

Mike O'Reilly, http://www.lsfaustralia.org.au/

Peter Abell's Petre III

RC Soaring Digest, July 1984, Vol. 1 No. 7

Hi Start

August and September are supposed to be the hottest months of the year, but how about June! Wasn't that something? Here in New Hampshire, the weather set new records of high temperatures for the month. Over 100 degrees in Boston, and 95 degrees right here in good old cool Peterborough. You guys in the south and the west are used to such things, but we poor Yankees have troubles when the heat and humidity both go above 90.

Speaking of hot stuff, the PETRE III featured on this month's cover is one of the hottest new designs in Australia, and it has been cleaning up in Open Class competition as well as in 2-Meter contests. The designer and builder, Peter Abell, is also a pretty hot pilot, so that has a little to do with PETRE III's success. Having heard about this ship from several sources, I managed to twist Peter's arm and get him to do a three-view and specs for us. He'll probably not be quite the same again, as he'd much rather show his stuff in the air than in print. I once heard that those who write about soaring are like parrots, while those who soar are like eagles... so I guess we know who the eagles and the parrots are, don't we?

Happy Soaring, Jim Gray

<u>Description and Design Philosophy in Peter Abell's Own Words</u>

"It was designed about two years ago (early 1982) when 2 metre began to create some interest over here. I had the option (and plan) to build Dad's WINDSONG (not the Dodgson design, but an original Aussie 2-meter...JHG) but my competitive streak and my F3B involvement said to me that all of the other designs didn't suit me or my ideas of 'how.'

"The name came from a mate (Aussie for buddy or pal) of mine who calls me 'Petrie' (for pronunciation). I simply reversed the final two letters of my Christian name - Peter - to Petre.

"The design in planform has not been changed since the initial drawing. The III indicates that it is the third built, each with constructional changes only.

"Petre III, although very light (by average of other 2-M models) is also quite strong. The wing, in particular, is very strong. It is built up with 1/16" skins, fully sheeted. The spars are short, only 16" long on top and 10" on the bottom, made from hard balsa... no spruce or ply in the wings. The wings are covered with doped tissue for light weight, and weigh about 5 Oz. per panel, as finished.

"The fuselage has a light-weight fishing rod boom of fiberglass, mated to the rear half of a moulded nose. This is made in two sections of fiberglass and epoxy: the nose cone, as per Marjali

(A fine Aussie design for F3B - JHG) and wing root section without fillets. The empennage is standard, and fitted to the boom.

“Although the nose is quite long (10V) standard radio equipment will fit only if mini servos are used. The best quality and most powerful servos are required, especially for the stabilizer, as the aircraft is sensitive and any slop - even if slight - is transferred directly to the flight path.

Design Thoughts Incorporated in Petre

“Fuselage: Even though parasitic drag from a fuselage is very small, I decided to reduce it to as small a value as possible by making the fuselage aerodynamically ‘clean.’ The max boom diameter is 3/4” and the max nose cone diameter is 2%”.

The laminar-flow nose cone is a throwback to the Marjali (Stefan Smith’s F3B plane - a technique also used by Ralf Decker and some South African fliers - which I saw just prior to Petre’s design. The nose cone has another big advantage: it allows a much easier access to the radio gear which is anchored to a fiberglass arrow-shaft set into the wing seat area. Obviously, there is no air leakage through hatches and the like, since there are none.

“Wing: The Eppler 193 was chosen because my F3B planes have the E205, and - since I hadn’t used the E 193 before, but it would give me the needed speed range - it was a ‘go.’ I will not change the section on this plane in a hurry, as I feel from experience that this section is perfect for Petre. Observations of other aircraft with other sections, and matching them with mine, seem to reinforce this belief. There are two other possibilities that I considered, however: the Gottingen 795 and the Eppler 385. One for characteristics similar to the E-193 (the E 385) and the other for minimum sink in calm weather.

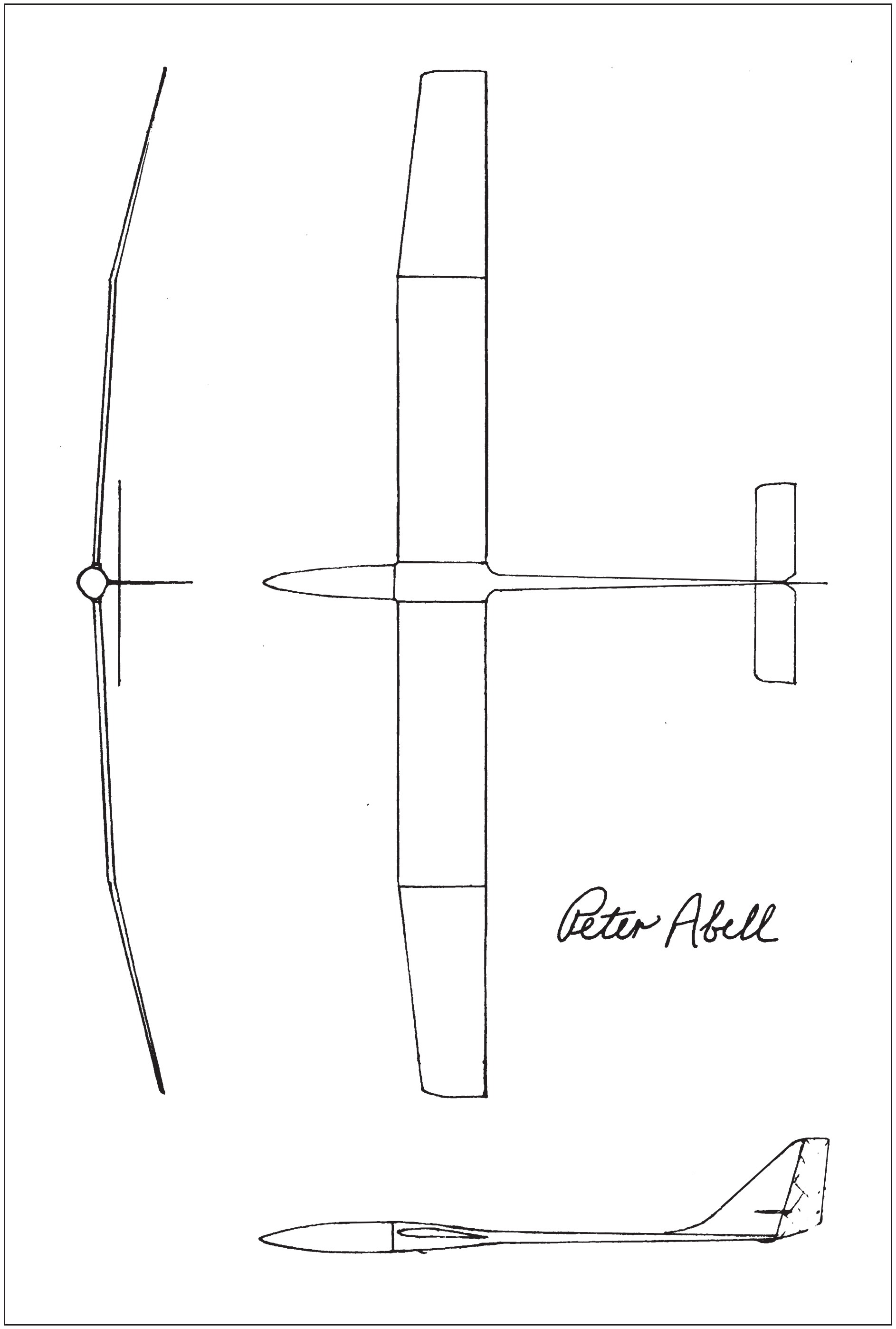
“Petre Finale: I feel I have fulfilled all design parameters, most to well beyond expectations. I find Petre extremely easy to fly, although many have trouble with her, as she is sensitive. (My flying style?) The flight character is very smooth (as in F3b) stability is excellent, and speed range is almost astounding (comments from bystander). Petre will go up in the smallest and lightest of lift, yet will sink very slowly when the air is dead. This is where I feel her only vice lies; she sinks marginally quicker than most Open Class soarers (better than 2M models?) in dead air, and flies a little too fast in these conditions. You can’t win everything with what I feel is an excellent compromise.

“Petre can be ballasted for wind with no detrimental effect on performance (as with F3b planes) in duration tasks. Speed is great. Although I’ve flown only one official run of 2 laps (300 meters, old F3b course) in 11.6 seconds, and I felt it a little slow, the second-fastest time was about 15 seconds, going to a Sagitta 600.

“Petre is responsible for 2 of 3 perfect duration scores (360/100) in the past 8 months. Not bad, without spoilers, spotting this way, and has brought many favourable comments.

Competition Record

“2nd; Nationals (thermal 1983/84): 4998/5000 in six rounds flown, group scoring (dropping worst round). 5000 neat was the winning score by Michael O’Reilly, who was 6th in the 1983 F3b World Championships.
“2nd; First 2-Meter Competition 1982.
“7th; Jerilderie LSF Tournament 1983.
“1st; 1983 RCAS Thermal State Championships:- 2-Meter; 6th overall.
“1st in 2-Meter, 1983 Heathcote Cup; Series I
“1st in Open and 1st in 2-Meter, 1983 Heathcote Cup, Ser. III. (F3b plane was flown in Series I Open; I didn’t fly Series II).
“3rd RCAS Open Thermal Round 4, 19 83; and
“Won 1982 Ted Swan Cup.



Odd Comments:

Petre's wing-joiner tube extends about 4½" into each panel, and is appropriately reinforced: tapered 2-3 bays farther out.

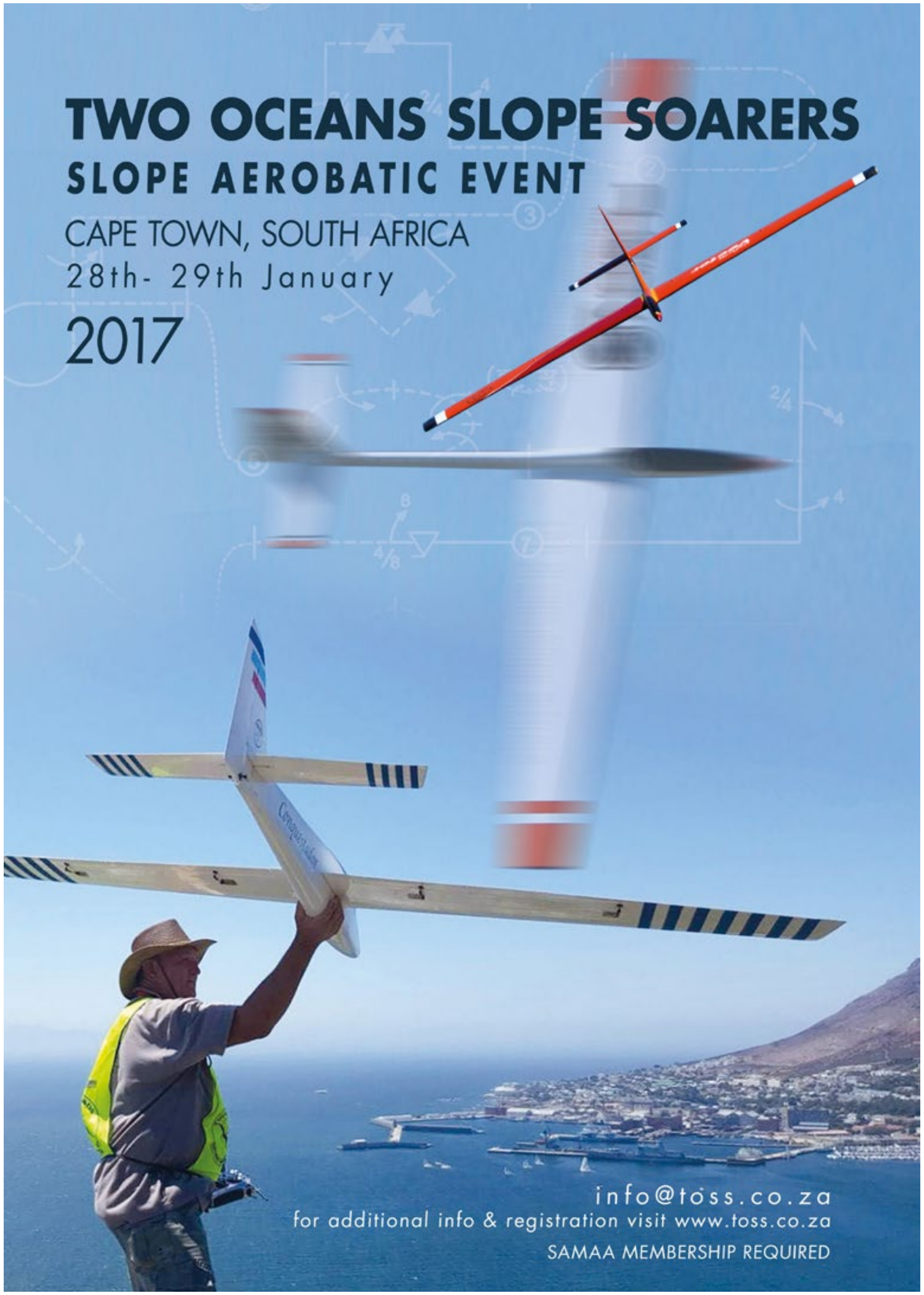
My F3b plane is unballasted at 13.6 Oz. per Sq. Ft., and Petre is ballasted to 12.6 Oz. per Sq. Ft. You may think the stab is small, but I flew my F3b plane with the stab at 8.2% of wing area for about 8 months, but when under pressure (poor conditions) it was hopeless. Otherwise, no problem. Interesting. So why have big stabs on state-of-the-art aeroplanes? Well, there's a lot more, but I'll save it for next time... and send pictures!

Kindest Regards, Peter Abell

Okay, here's the info on PETRE III.

Wing span	2M (78.75")
Root chord	178 mm (7")
Tip Chord	128 mm (5")
Aspect Ratio	12.2:1
Wing area	0.33 Sq. M. (504 Sq. In.)
Stabilizer span	442 mm (15")
Stabilizer chord	77 mm (3")
Stabilizer area	0.034 Sq. M. (45 Sq. In.)
Stab. % of wing	8.9%
Fuselage (O.A.L.)	1.02 M (40")
Nose Cone	Pfenninger Laminar 4910 (moulded fiberglass)
Weight (no ballast)	24 Oz.
Full ballast weight	44 Oz.
Wing loading	6.9 Oz. per Sq. Ft.
Ballasted Loading	12.6 Oz. per Sq. Ft.
Wing Section	Eppler 193

All-flying stabilizer is 10% Symmetrical Section



The TOSS Aerobatics Competition has a long tradition of being flown at their favourite summer slope of Red Hill and the committee set about preparing for another event to match the previous year's where a stonking south east wind supplied almost perfect lift conditions all weekend.

There had already been a few setbacks, notably the untimely theft of the club landing mat in mid-December. While this threatened to stall practising opportunities, thankfully the good people at Christy Sports made us a 20 x 9m replacement in the nick of time before all the factories closed for the December break.

Nothing could have prepared us however for the tragic fire that broke out on the 11th of January laying waste to much of Redhill and the surrounding Simonstown mountainside. Within a space of two hours, our once lush SE flying site had been reduced to a lunar landscape with nothing but charcoal where hardy Proteas once grew. Our only consolation was that nobody was hurt during the blaze.

So the challenge was on, find another south east facing slope good enough to host a world class aerobatics event with little more than two weeks to go.

Although Smitswinkel Bay had been used in the past, this location requires a very strong ESE wind to work effectively and so the much speculated slope at Rondebossie north of Durbanville was investigated.

After a covert but fruitful reconnaissance trip, the land owner agreed to let us use his field for the competition as a once-off opportunity after much persuasion from Christo le Roux. So we had our backup SE slope even if it wasn't as good as Red Hill.

The week leading up to the event saw everyone checking their favourite wind prediction tool which proved that the wind Gods where laying down the ultimate challenge, namely no wind at all!

Charlie Blakmore's Swift heading for the clouds.

With every advancing day the predictions just deteriorated and by Friday, the only hope looked like a light NW wind on Sunday afternoon, much like the 2015 competition.

The event was called to order at the Red Hill Naval Canon on Saturday morning, 9:00am sharp, amidst warm welcomes for the Durban contingent of Rudi Smook, Lance Cranmer and Dave Greer, and also Bob Skinner from Joburg attended as a judge for this, his second competition with us.

After the obligatory pilots and judges briefing, we all tucked into breakfast rolls supplied by Dixies Restaurant which are always a treat.

Ever keen to check the wind conditions, William Cranmer put up a small DLG glider which floated precariously for a few minutes and then sank down to one of the ridges below the front of Red Hill.

William, his dad Lance and Bill Dewey descended amongst the charred debris to find the glider and returned half an hour later in desperate need of liquid refreshment and a change of clothes.

And so the team spent the rest of the morning talking in small groups of all things slope related, taking cover from the occasional passing shower while we waited for the wind conditions to change.

Steve Meusel stationed himself out at Kommetjie while Ryan Matchett and Peter Beretta went to Monkey Valley to see if the predicted light SW wind would materialise.

After an equally delicious lunch from Dixies at 1:30pm, no favourable news had been received from either flying location and the decision was taken to abandon competition flying for the day. Some weary travellers took the opportunity to catch up on some much needed shuteye while the rest ventured off to Kommetjie to see if anything would stay afloat.

An enjoyable afternoon was spent flying Bee Wings and small scale gliders in the light lift conditions along the ridge above Soetwater.

Fortunately, no long walks were required to fetch stray planes and we eventually retired to Fisherman's for some liquid refreshment at 3:30pm.

At supper later that evening, the big debate centred on whether the predicted westerly on Sunday afternoon would work better at Signal Hill or Kommetjie.

Come the morning, our resident wind guru Kevin Farr predicted a Signal Hill preference and so the call was made to assemble there at 10:00am to see if we could squeeze in at least one round of competition flying.

Upon arrival, we could see the cold front just off the coast but conditions were still too weak to float out even the lightest of planes.

By 11:30 the breeze quickened, however, and at midday, conditions had improved enough to try a flying round. The Contest Director called on Open Class to start and pilots Schalk Human with his Vector III and Peter Beretta with his Toucan were first on the flight line.

Peter struggled to gain enough height to fly his chosen manoeuvres effectively and had to abandon this round but Schalk managed all ten manoeuvres.

Next up were Hans van Kamp with his scratch built Aresti and Lance Cranmer with his Minivec and while the lift was still challenging, they managed to successfully complete their round, too.

Finally, last year's runner up Ryan Matchett chose to use his Ceres F3B glider instead of his trusty Vector III and the strategy paid off as he was able to make much better use of the weak lift.

Next to fly were the Scale Class competitors with some very impressive looking machines.

First up were last year's champion Christo le Roux with a sexy new orange Foka and Charlie Blakemore with his white Graupner Swift.

By now the wind had strengthened to a half decent westerly and with a small change to the centre line of the flying box, performances began to improve.

Next up were Dave Greer with a freshly restored yellow Swift and Rudi Smook with his Condor which is actually designed for electric power, but Rudi has kept it unpowered and gorgeous it looks, too.

The final pairing were Kevin Farr who was tempted into entering at the last minute with his 4m ASW and Steve Meusel flying Dave's Swift. Kevin more recently competes nationally in thermal soaring, and Steve has taken a two year sabbatical from competition flying so it was a real treat to see him back flying aerobatics.

Finally, the much anticipated Expert Class with Christo le Roux, Louis Genade and Marc Wolff the top three favourites to win the class.

With battle lines drawn, Christo le Roux with his scratch built Fusion and Louis Genade with Hans's Aresti took to the sky for some serious flying artistry.

Veteran pilot Marc Wolff with his legendary Primerius and Noel Cochius with a Vector III flew next which was equally entertaining.

Last up was wild card William Cranmer with his customised Minivec and he flew it with aplomb considering his primary RC talent is flying helicopters at competition level.

Peter Beretta was given another opportunity to try his Toucan in the improved conditions where he was able to find enough lift energy and height to fly his ten manoeuvres for Open Class.

Peter currently lives in the UK and was able to enter the competition as the dates coincided with this holiday plans (at least that's what he told his wife but we think it was the other way around!).

And so with Round One complete and no available time to fly another, the committee prepared for prize giving and at 4:00pm, everyone gathered in the car park to learn how they had fared.

Christo le Roux retained the Scale Class trophy with a healthy lead while Steve Meusel and Dave Greer took 2nd and 3rd place respectively.

Ryan Matchett took a much deserved 1st place in Open Class having just been pipped by Rudi King the previous year. Hans van Kamp and Lance Cranmer took 2nd and 3rd place respectively.

Christo le Roux took 1st place in Expert Class with 2nd and 3rd place going to Louis Genade and Marc Wolff respectively. The expert class trophy now alternates annually between Christo and Louis's trophy cabinets!

Special recognition also went to the most improved pilot, Noel Cochius, who was the only pilot that managed to score a better average on the day from the 2016 competition.

The draw for the raffle prize of a whole lamb revealed that Christo's mother-in-law was the lucky winner, so he really did walk away with all the prizes this year.

Finally and for which we are eternally grateful, a huge thank you to our sponsors without which prize giving at our competitions would not be possible. In alphabetical order, our sponsors: AMT Composites, Dixies Restaurant, Hobby Land, Hobby Mania, Hobby Warehouse, Proficient Packaging and RC Hobby Shop.

Many, many thanks to the three judges Andrew Anderson, Stuart Nix and Bob Skinner who gave their precious time to support our competition and share their valuable expertise.

Thanks also to our photographers Doug Ross, Nic Steffen and Steve Meusel for snapping all the action and more at the event.

Finally a big thanks to the TOSS event organisers who give their time freely to prepare and host this event every year: Contest Director Jeff Steffen; Safety Officer Bill Dewey; Scoring Administrator David Semple; Photographers Steve Meusel, Nic Steffen and Doug Ross; and finally the TOSS Chairman Schalk Human for his leadership and passion.

Next year will be the 10th anniversary for TOSS Aerobatics so please join us in 2018 for an extra special event!

— David Semple davidsemp@gmail.com

Christo le Roux's Foka


ZS-CO

Schalk Human with his Vector III.

Peter Beretta and his Toucan after Round 1 Open Class.

Dave Greer and Steve Meusel delighted with the Swift.

Rudi King and his Condor.

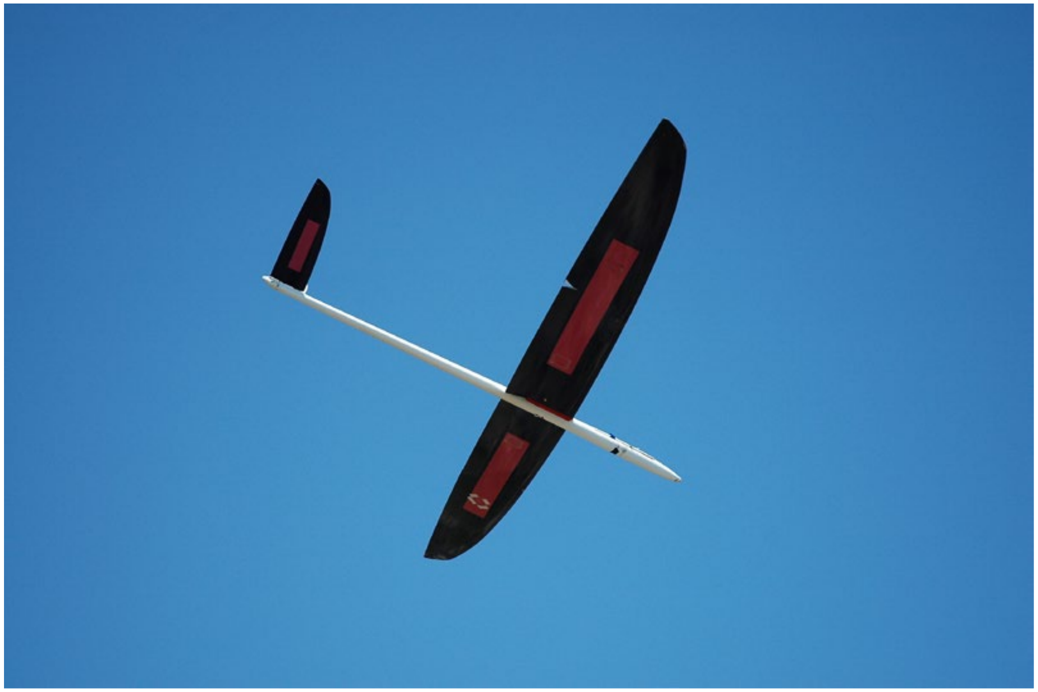
Steve Meusel's Swift gets launched.

Competition judges Bob Skinner, Andrew Anderson & Stuart Nix.

Charlie Blakemore & Christo le Roux.

Noel Cochius safely down with his Vector III.

William Cranmer with his renovated Minivec.



Enjoying light conditions at Kommetjie.

Dave Greer, Steve Meusel and Kevin Farr on the flight line.

Jeff Steffen remains focused while Bill Dewey looks for a photo.

Testing lift at Red Hill with e-gliders, recent fire damage visible.


Hobby
PROFICIENT
RC HOBBY SHOP

Vertical tail of Christo le Roux's scratch built Fusion.

Noel Cochius, with transmitter, waits to fly his Vector III.

Louis Genade and Christo le Roux.

Pilot and spotter showing the required level of concentration.


9
15
Slope Soarers
Two Oceans

Group photo: Standing left to right: Louis Genade, Christo le Roux, David Semple, Stuart Nix, Bill Dewey, Schalk Human, Dave Greer, Peter Beretta, Rudi Smook, Steve Meusel, Jeff Steffen, Lance Cranmer, William Cranmer and Bob Skinner. Kneeling left to right: Andrew Anderson, Malcolm Riley, Charlie Blakemore, Hans van Kamp, Ryan Matchett, Noel Cochius and Marc Wolff.

Open Class competitors ready for action.

Noel Cochius and Marc Wolff on the flight line.

Group photo at the Canon before abandoning competition flying.

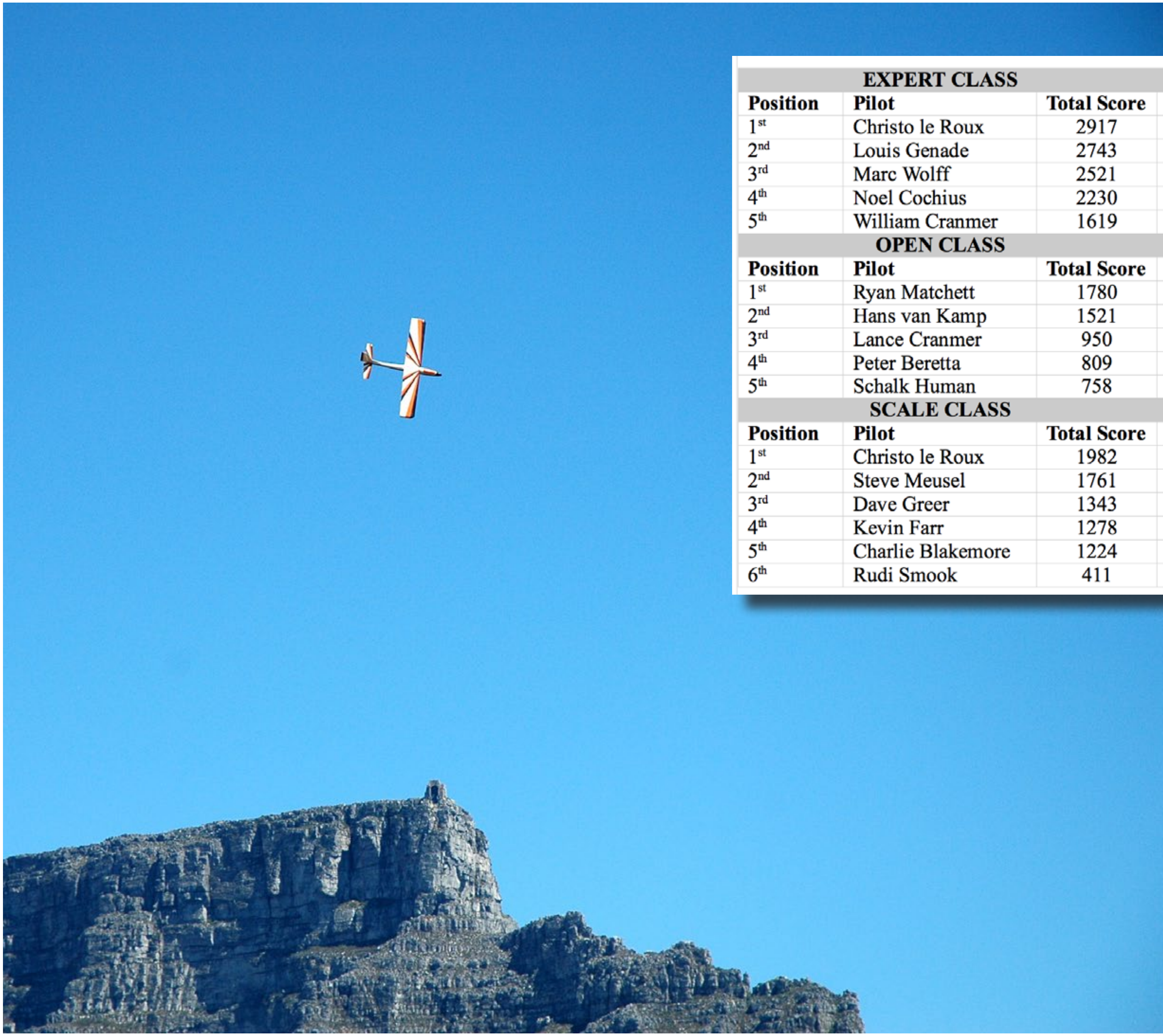
Louis Genade and Christo le Roux flying the Expert Class round.

Trophies Open and Expert Class. Schalk Human presenter.

Christo le Roux accepts trophy for first place Expert Class.

Ryan Matchett accepts trophy for first place Open Class.

Noel Cochius accepts prize for most improved pilot.



EXPERT CLASS			
Position	**Pilot**	**Total Score**	**Normalised Score**
1st	Christo le Roux	2917	100%
2nd	Louis Genade	2743	94.0%
3rd	Marc Wolff	2521	86.4%
4th	Noel Cochius	2230	76.5%
5th	William Cranmer	1619	55.5%
OPEN CLASS			
Position	**Pilot**	**Total Score**	**Normalised Score**
1st	Ryan Matchett	1780	100%
2nd	Hans van Kamp	1521	85.5%
3rd	Lance Cranmer	950	53.4%
4th	Peter Beretta	809	45.5%
5th	Schalk Human	758	42.6%
SCALE CLASS			
Position	**Pilot**	**Total Score**	**Normalised Score**
1st	Christo le Roux	1982	100%
2nd	Steve Meusel	1761	88.9%
3rd	Dave Greer	1343	67.8%
4th	Kevin Farr	1278	64.5%
5th	Charlie Blakemore	1224	61.8%
6th	Rudi Smook	411	20.7%

GLUE CADDY

Steve Henderson, stvnderson@gmail.com

Here is an idea that has been kicking around in my head for some time.

Adhesives: There are so many out there. As a Free Flight builder, one tends to try everything at least once, and with time, determine if it is a keeper or not.

I had tried so many adhesives, my "box of tricks" was huge. As such there were adhesives that were over the hill, only used once in a great while, some only effective on very specific applications.

I had big "economy" containers that had gone bad with half of the glue left. But I kept them all. The ones I used on my last three builds found their way to the bench and I kept them in a small area where I could grab them quickly to use. This became my short list of "at hand" adhesives.

I learned long ago that buying adhesives in big containers is a waste. I've tossed a hundred dollars worth of glue in the trash after it runs out of shelf life. There are ways to put the bulk containers of CA for instance, in the freezer and transfer to the smaller container as needed. My wife said, "not in my house," so that idea fizzled.

I am at a stage in my life where I can afford to use fresh glue on my projects, and buy sizes that fit my style. Also the big containers are too clumsy to use for building, so I always transferred into smaller, handier sizes for actual building.

I discovered pipettes and they are the bomb. My pile got smaller still. I write the purchase dates on all my glues so I can toss them when they are over the hill.

Sometimes I build on one end of my table, sometimes the other, and sometimes on a different table when working two projects at once.

So I put my pile of go-to glues into a clear shoebox and voila, I had a way to go from one area to another.

Problem: the CA pipettes always fell over and spilled, or had to be leaned upright very carefully to prevent that. Something was always spilling. Nothing wanted to stay upright or behave in any way. I had to pull items out and look at them to determine what they were.

Brainstorm: I need a caddy to put the ones I use the most into a format where I can move it around, and nothing will spill. Everything will have a place and that's where I'll keep it.

I drew up the plan for my building table glue caddy and built it. Put a handle on it so it is easy to grab. Nothing tips over and I'm real happy with it.

There are a couple of laser-cut kits out there for similar items (Retro RC?), but I looked at the layout and found that they were too universal for me. I wanted the perfect caddy for me, and based on the style of building that I do at this stage of my life (FAC scale and small endurance models) that's what I designed and built.

It has holes for rubbing alcohol, 5-minute epoxy, Sobo, CA accelerator, thin CA, medium CA, full strength Titebond original, and slightly thinned Titebond original. It has six holes for pipettes to stand vertically. Then there is a little front tray for small tube each of Duco, Ambroid and UHU stick.

I still use other glues, i.e. 3M spray 77 and others that I use only very sporadically. You can't get a handy size of them, so they stay in a cabinet on a shelf.

When I showed it to my friends they were a little aghast that I had so many "go to" adhesives. This got me thinking about the matrix of model jointery that I then drafted up. It is a work in progress, but it justifies my collection somewhat.

After my friends looked at my caddy for a while, I had to pry it back out of their hands.

Glue		Duty		
X to	Y	light	med	heavy
balsa	balsa	CA,TB, Cell.	CA,TB, Cell.	TB,epoxy
balsa	ply	na	TB, Cell	TB,epoxy
balsa	hardwood	na	TB	TB,epoxy
hardwood	hardwood	na	na	TB,epoxy
hardwood	ply	na	na	TB,epoxy
ply	ply	na	TB	TB/epoxy
music wire	wood	Cell	Cell/thread	epoxy+thread
music wire	music wire	thread+CA	na	JB weld/wire
Tissue	balsa	ND,WG,UHU	na	na
Carbon	balsa	na	med CA	Med CA/thd wrap
mylar	balsa	UHU/3M	na	na
mylar	carbon rod	3M	Dave's	
PETG	balsa	na	Sobe	na

Table of Abbreviations and products for benchtop

CA	Cyanoacrylate
TB	TiteBond
Cell	Ambroid/Duco
Epoxy	Two part glue 5 minute for light duty or 30 minute for HD
ND	Nitrate Dope
WG	White glue thinned with water
UHU	Gluestick
3M	3M super 77
Dave's	Dave's Flexament fly tieing cement
Sobe	sticky craft glue for plastic canopies, windows dries clear
Rubbing Alc	for thinning UHU
Accelerator	For med CA

Note: Use 3M-spray 77 for tissue on delicate balsa frames

About the author:
Steve Henderson has an obsession with flight and a love of both soaring and building. Steve flies RC at a slope at Kepps Crossing in Southeast Idaho and has a Bird of Time which he built from a kit back in the 1980s. He is a free flight enthusiast who pilots a 15m sailplane during the summer months.

This material originally appeared in *Free Flight*, the National Free Flight Society Digest, Don DeLoach Editor, November-December 2016, Volume 50 Number 6, page 29. Reprinted with permission.

F5J Canada has launched!

F5J Canada was created to promote the FAI (Fédération Aéronautique Internationale) F5J competitions in Canada, and we are pleased to announce the creation of this association.

At the first General Meeting held March 7 2017, F5J Canada elected its first Board of Directors:

President: Fabien Gagné

Vice-President/Contest Coordinator: Luca Valle

Secretary: Isabel Deslauriers

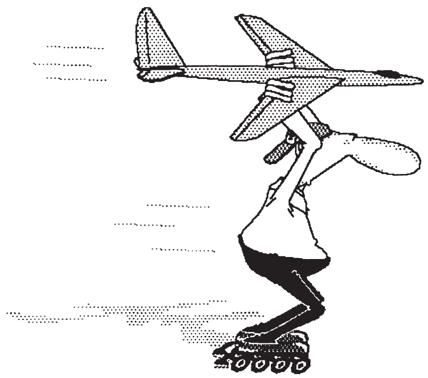
Treasurer: Jacques Girard

"With **F5J Canada**, we hope to create a league environment for RC sailplane competitions to thrive in Canada" said Fabien Gagné.

F5J Canada also launched its website: http://**F5J.ca** which provides the Master Schedule for F5J events in Canada, national standings and links to various F5J primers, items and discussion boards.

F5J Canada is also an authorized dealer of the Aerobtec Altis v4+. The Altis is one of the approved Altimeter/ Motor Run Timer (AMRT) devices required for F5J. Available on our website **F5J.ca**

The **F5J Canada Summer Tour** runs from May to October and **Winter Tour** from November to April. We invite all CD to register their competitions on our calendar.



Gordy's Travels

Choreography of an F3RES Contest

Gordy Stahl, gordysoar@aol.com

For those not familiar with the new craze class called F3RES, take a look at last month's *RCSD* where I pretty much covered all you'd like to know.

In summary, it's 2 meter (78.75" max) "mostly" wood ships launched from matched high starts, stretched a matched distance. They are Rudder/Elevator/Spoiler designs created for this event weighing an average of about 18ozs.

The Task:

Created as a spin-off of the international class (FAI) F3B, F3RES consists of a flight target time and a measured landing.

The flight window of 9 minutes begins and ends with a horn. Pilots can launch multiple times with the goal of 6 minutes (so that means only twice likely), keeping the time earned from the final launch.

If a pilot does not land before the 9 minute window ends, he loses any landing points he might have earned on the landing tape.

It Takes a Team!

Simple? Sounds like it but it takes a "team" in order to make it work, that is each pilot has to have a team to support his flight.

The Optimum Team:

- The Pilot
- The Timer
- The "'Chute Chaser"

(This is not a correct name for this person because parachutes are NOT used. Instead a simple flag or strip of colored cloth are attached near the high starts ring.)

Why not a parachute?

Because a 'chute would cause the lines to follow the direction of the wind at the time of the launch. That means a possibility of a lot of running and line tangling.

Remember, the pilot NEEDS that high start back as soon as he does his first launch, in case he needs to abort a probable short flight time in lieu of another launch.

Since 6 mins in a 9 minute window doesn't leave a lot of time for indecision.

Timing and strategy are as important as is flight skills and thermal reading.

For a general overview of the F3RES Class, see *RC Soaring Digest* March 2017

Manpower!

So a six pilot contest would need a total of 18 people just on the field! Okay, not too realistic.

So what's the alternative? I see two.

#1. The next best team set up would consist of three, **but using a member of the next group as a temporary "member" to help:**

- The Pilot
- The Timer
- The Next group pilots acting as 'Chute Chasers.

Here's how the 2½ Team looks:

• The Pilots and Timers are on their launch spots, the acting Chute Chasers (Pilots from the next flight group) are waiting at the high start ends.

• The Pilot launches and the Chute Chasers would immediately be guiding the falling lines as they walked toward the launch spots.

• The Helper 'Chute Chasers would then wait to see if the high start is needed again by his Pilot. IF not he would then go get his model ready for his group. The key points about the 'Chute chaser" is he does NOT stretch it back to the pilot's station or it will lose its tension. He DOES, however, bring it back straight immediately so that it is not fouling the other lines, and is close enough for the pilot to grab it if a relight is needed.

#2. In the case of not a lot of spare people to share, then a two man team would work consisting of:

- The Pilot
- The Timer/Chute Chaser

The pilots cue up on their launch spots, their timers waiting at the high start ends.

As soon as the Pilots release - the Timers start their clocks - and as 'Chute Chasers begin walking/guiding the high starts back to their pilots for a relaunch if needed.

The High Starts:

The high starts consist of specified strength and length rubber tubing, and a specified diameter and length of monofilament line.

Wait a second, don't rush past these points because both of those materials tend to change their strength and lengths depending on the temperature!

Between launches, the high starts are pulled straight but not stretched and anchored. Just prior to a Pilot launching, he walks to the end, hooks the high start to his model and stretches it back to the launch station. **That insures that the high starts maintain their optimum launch consistency.**

The Timer's Stop watch(es)??

Yup! Two watches counting down are needed per Pilot!

The Pilot's goal is a 6 minute flight in that 9 minute Flight Window, so it's important for him to know where he is in that Window before he decides to relaunch for a better flight time. **Someone needs to keep track of how much time is LEFT out of the 9 minutes available!**

IF the Pilot got a 4 minute flight on his first launch, that leaves 5 minutes possible left, but in fact nearly impossible to get including the relaunch time.

So two stopwatches need to be started, a Flight Window watch and a Flight Time watch. (It can get complicated with the wrong clock reset and restarted in the case of a relaunch.)

Stopwatch Option 2 is Easier!

So in order to avoid stopwatch snafu's, the event organizer starts a talking Master Clock at the beginning of each window which audibly reminds the Teams of the remaining amount of minutes in the Flight Window, ie:

“The Flight Window will start in 3,2,1 BEEP!”

“There are 8 minutes remaining.”

“There are 7 minutes remaining,” etc., until “There are 10 seconds remaining in the Flight Window... ...3,2,1 BEEP!”

Remember landing after the BEEP means zero landing points!

And Now a Word about the High Starts:

They aren’t that important! Well, as far as meeting the posted Specifications go.

IF the event were an FAI Event then all aspects of the rules would have to be met, but for a F3RES Contest in the USA, what is important is that the High Starts mostly conform to the spec’s.

Mostly Conform?

That means that they do not exceed the pull strength of the models. The actual F3RES High Starts are just strong enough to pull up a light weight 2 meter span ship (sub 35oz for instance), but likely not strong enough to pull up a wood 100" class model very well. (A good example of this would consist of TheraBand Green rubber.)

The Same! Not Similar, not Alike!

ALL of the high starts used at a contest need to be the “same.” Same rubber, same line, same lengths, so regardless of which Flight Station a Pilot launches from it’s identical to the other Flight Stations. **High starts need to be supplied by the host club, or the host club needs to measure components and pull test any high start to be used to insure consistency.**

F3RES Class could be, should be fun. If nothing else, it may lead to us all losing a few pounds on the field !

If you have comments or questions, even suggestions about F3RES, please email me at GordySoar@aol.

Gordy and his Airtronics Square Soar. It was created by Lee Renaud to fill in the bottom end of their product line. Totally competitive, believe it or not, despite having a span of just 70”. Simple, cheap, one rib size and shape for the whole wing... turned out to be a really good sailplane! I got this one at a Dayton Swap meet. First flight off a F3RES spec high start in very cold air was 20 mins. You can see it fly if you visit <https://youtu.be/FgjZEbpFM0o>.

Minimizing Slop in Control Surfaces

Dieter Mahlein, via http://www.xcsoaring.com

Slop is a problem, especially in high-performance gliders. At best, slop makes flying more difficult; and at worst, it can lead to flutter which in turn may cause air frame failure.

There is "hard slop" and "soft slop." Hard slop is caused by play in the linkage, for example in the servo gears or at the clevis. Hard slop has clearly defined end points, is readily identified, and there are easy ways to minimize it, even after radio installation is complete. Soft slop is caused by something bending or deforming under load; it is a stealthy killer of air frames. Unlike hard slop, it may be difficult to detect during pre-flight procedures, it is difficult to eliminate, and it definitely can be a serious problem. Soft slop has no defined end points and varies in severity with the aerodynamic load on the glider. Soft slop must be prevented during construction and assembly of the air frame and installation of the radio gear.

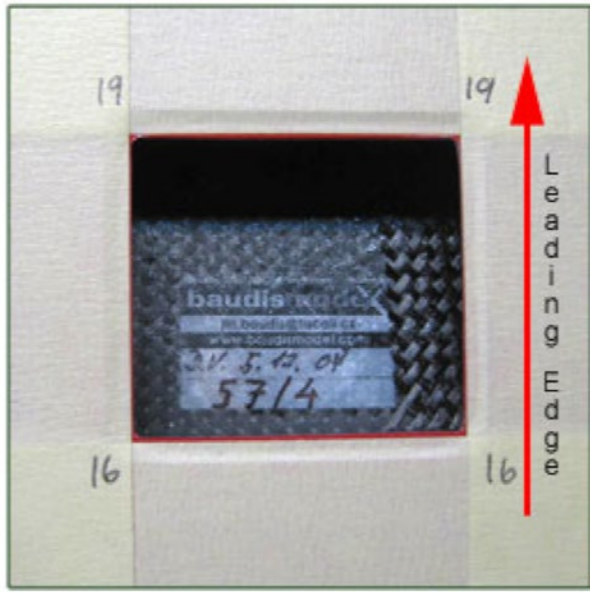
Slop can occur anywhere in the control linkage: from the servo and the servo mount, through the linkage itself, to the control horn and the control surface.

Servos can have internal gear slop, and cheap servos tend to have more of it than quality ones. This is a source of hard slop, and there is nothing to do about it other than use good servos. Be aware that the gear trains of even the best servos will wear over time and develop slop. Changing the gears may not fix this completely because the pins on which some of the gears rotate have worn their bushings. Therefore, replacing the parts of the servo case which contain these bushings will help.

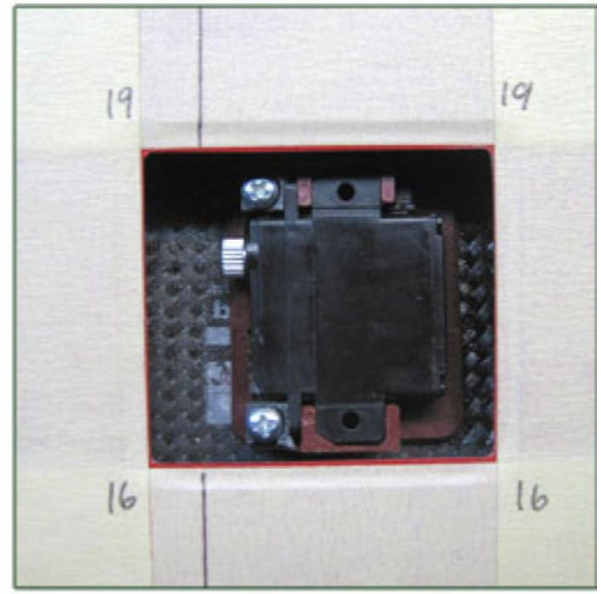
A weak servo output arm can be a source of soft slop. Quality servos come with strong arms and for some, after-market metal or composite arms are available. Again, use quality servos with strong arms. Importantly, we can minimize soft arm and hard gear slop by attaching the linkage as far inside on the servo arm as possible. Ideally, adjust the linkage such as to use 100% of the available servo travel. Be aware that electronic mixes, particularly on ailerons and flaps, use up servo travel. Thus, having a strong arm which allows attaching the linkage a little farther out than minimal makes set up easier.

Slop in the servo mount occurs in sheeted and composite foam core wings and in molded wings where the servos are glued to the inside of the wing skin. Aerodynamic loads are transferred from the control surface via the linkage to the servo which flexes the wing skin. This is soft slop, it is as serious as it is hidden, and it must be eliminated during servo installation.

The best way to do this is to box in the servo with braces which tie the wing's top and bottom skins together around the servo.



A typical wing-servo pocket in a hollow-molded wing. Tape it off with masking tape to protect the wing and optionally note pocket depth in the corners.



Test fit the servo you want to use; here is one with optional servo frame. If there is sufficient depth, reinforce the inside surface of the servo pocket. The line marks the plane in which the linkage will be located.

Ideally, this box and the servo themselves are tied into a wing spar. If the wing is sufficiently thick, also reinforce the wing skin to which the servo is mounted.

Assuming we use common metal clevises (don't use plastic clevises on performance planes), linkage slop can happen between the servo arm and the clevis; in the push rod threads, if the clevis is threaded; and finally between the clevis and the control horn on the control surface. This is hard slop, and it is easy to fix with a few drops of CA. A drop of thin CA placed on the threads next to the clevis will eliminate all slop there. Of course, make sure the linkage is properly adjusted before CAing it.

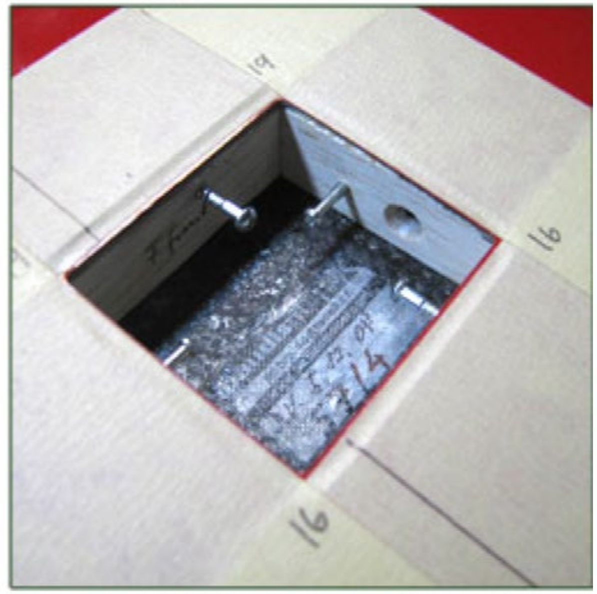
Likewise, a drop of thick CA placed at the junction between clevis and control horn or servo arm, when kicked, creates a bushing which eliminates slop without binding up the linkage. Don't worry, you can simply break loose the linkage and make the movement smooth and slop-free. This works for nylon, composite, or metal arms and horns, linked to metal clevises. Note that this CA bushing is necessary only if there indeed is slop at the clevis pin, so check for it before using this method.

At the control surface itself, make sure to use strong, rigid control horns. The common nylon ones are useless in performance gliders; use metal, composite or strong plywood horns instead. This way there is no bending or flexing, and you only have to deal with hard slop, if any.

The bigger and heavier the control surfaces, the longer the lever of the horn should be. Always place horns and linkages opposite the side where the surface is hinged; this automatically increases leverage by the thickness of the control surface and minimizes horn length; for example, bottom-hinged flaps should be linked at the top.

For more information, I highly recommend Radio Carbon Art's "F3 Building Clinic" video, which, among other things, details proper linkage construction and geometry. This video, and the one called "Performance Tuning" contain valuable information for anyone wishing to optimize their gliders' performance.

The blocks prepared for installation. These are 3/16" balsa, which suffices for these stiff carbon wing skins. For more flexible skins, consider using thicker balsa and/or pieces with vertical grain.



The blocks are in. The screws are temporary handles to help position the pieces accurately. Holes for the servo wiring and a linkage slot are cut into the blocks before installation.

This "box" ties the top and bottom wing skins together to form a rigid pocket which will not flex under load. I used very little PU glue which foams slightly and forms a strong and light-weight build.

Soaring over an active volcano

Not sure where or when this photo was taken, but it is certainly impressive what with the molten lava and rising steam.

Al Bowers posted this image in a small size some time ago and by chance we were able to find a larger version (2126 x 1417 pixels) by way of Pinterest and a link to http://imgur.com/r/Gliding/qccGy. The imgur.com post is dated 05 April 2011 and there is no further information available as the photo EXIF file is empty.

You can download the "full size" image from the *RCSD* web site: <http://www.rcsoaringdigest.com/images/Soaring_over_volcano.jpg>.

wing tip devices

Chuck Anderson, chucka12@outlook.com

Forty years ago, Whitcomb winglets could be found only on experimental aircraft. Today most transport aircraft and many sailplanes have winglets so any without them look strange. Winglets have come a long way since 1975.

I have been playing with winglets on radio control model airplanes for forty years and writing about them for almost as long. I learned about Whitcomb Winglets in 1977 while working on a University of Tennessee Space Institute research proposal. The project was never funded but the NASA reports I reviewed got me thinking about using winglets on models so I decided to see if I could measure any effects on model airplanes.

I needed a low aspect ratio wing to generate strong tip vortices to make it easier to measure winglet effects.

I adapted my 1978 sailplane by removing the outboard wing panels to produce a 75-inch span wing with an aspect ratio of 7.5.

The winglets were designed from criteria in NASA TN D8260 but with the winglet tip chord increased to avoid unnecessarily low Reynolds numbers. The winglets added 3 inches to the span so I was able to fly the Winglet Spica in 2-meter contests for the next 20 years.

Without the outboard wing panels, the tip chord was 10 inches and TN D8260 suggested that the winglet height should be one chord length. Ten inch tall winglets on a low aspect ratio wing produced a very strange looking model. (See Photo 1.)

Photo 1. 1979 Winglet Spica

I built another Winglet Spica with a modern airfoil for a 2009 club contest. (See Photo 2.) “Thirty Five Years of Winglets” in the June 2012 *RC Soaring Digest* contains a summary of my May 1980 *Model Aviation* article on winglets and information about the 2009 Winglet Spica with a higher performance airfoil.

Flying since 2009 has revealed that low drag airfoils make it more difficult to obtain some of the advantages of winglets.

Winglets are one speed devices and transport aircraft spend most of their flying time cruising at a constant speed so the initial winglets were designed to operate at that airspeed.

Thermal soaring models normally fly at airspeed for minimum sink in a thermal and the Spica winglets were set at the toe out angle for minimum sink. The 1979 flight test determined that the best toe out for maximum duration was 3.5 degrees and the winglets were set at that angle. Flying at airspeed significantly different from the design speed increases winglet drag.

Airspeed for minimum sink is just above stall speed and the Spica winglets produced a wing rock when flying at low speed near thermals. It's almost as if the model is waving and saying "Here it is." I won several 2-meter contests using wing rock to locate thermals in contests with light wind and weak thermals. Unfortunately, few contests had light wind.

The most surprising difference between the 1979 and the 2009 Winglet Spica was how much harder it was to maintain a constant air speed when flying near stall. The Spica with the AG35 airfoil would quickly accelerate to a higher speed when disturbed either by a control input or a wind gust while the thick flat bottom airfoil maintained a more constant airspeed. The 2009 Winglet Spica did not signal lift with wing rock.

The biggest advantage of the Winglet Spica had over normal 2-meter sailplanes was how much easier the wide chord wing and giant winglets were to see in a thermal.

Some of the advantages of the lower drag AG 35 airfoil were lost when coming back from downwind because of winglet drag when flying at higher air speeds. There ain't no such thing as a free lunch. At least I never had trouble identifying which model in a thermal was mine.

Wingtip effects on wing drag were discovered before the Wright Brothers first flight. Frederick W. Lanchester formulated his circulation theory of wing lift in 1893 and it was the foundation of modern airfoil theory. Lanchester suggested that wingtip devices could benefit wing performance and patented the concept of a wing end plate in 1897.

Photo 2. Current Winglet Spica

The Wright Brothers used data from their wind tunnel tests to increase the wing aspect ratio and design curved wingtips to reduce drag. Aerodynamicists have been looking at ways to reduce wingtip drag ever since they discovered that wingtip vortices produce drag. End plates were an early device that attempted to control wingtip vortices.

Sighard F. Hoerner experimented with various wingtip shapes to reduce drag. When I was working on V/STOL projects in 1970, I spent a lot of time studying his book, *Fluid Dynamic Drag*. In that book, I found data from a WWII German wind tunnel test on the drag of wingtips being used at that time. The report found that all wingtips except one had higher drag than

Photo 3. Tern IV 1974

Photo 4. LilAn Omega 2016

the wing without a wingtip. The only one that reduced the drag tapered the wing thickness to a knife edge over the last chord length of the span. Hoerner called this tip full sharp and I used it on my 1974 Tern IV and later sailplanes.

My studies of Horner's wingtip devices led me to NASA report TR-R-139; "The Theory of Induced Lift and Minimum Induced Drag of Nonplanar Lifting Systems" by Clarence D Cone Jr. This started me searching for other reports on nonplanar wings. These reports indicated that induced drag could be reduced by using elliptical or circular wingtip dihedral instead of straight wings.

Whitcomb has said that his winglet studies were inspired by Cone's work on nonplanar wings. I used Cone's work to design a linear approximation of elliptical wing dihedral for most of my sailplanes since 1974. See "Adventures With Nonplanar Wings" in the June 2013 issue of *RC Soaring Digest*. (See Photos 3 and 4.)

Raked wingtips are reported to reduce drag. Raked wingtips are not really nonplanar but are frequently included in articles about nonplanar wings.

NASA tested winglets on a KC-135 in 1980 and found that they gave a 6.5% improvement in range. The experimental winglet cant and toe out angles were adjustable and the best toe out angle was 4 degrees.

The 1977 Lear Jet 28 was the first commercial airplane to use winglets and the 1986 McDonnell Douglas MD11 was the first large jet transport designed to use winglets.

Once winglet performance increase was demonstrated in actual service, wind tunnel test and computer conformal fluid dynamic studies expanded the applications of wingtip devices to a wide range of applications from stall speed to near Mach 1.

Winglets have been designed to improve the spread of insecticides from crop dusters, shorten takeoff distance, increase rate of climb, increase cruise speed, or reduce fuel consumption.

The winglet must be designed for the airspeed where maximum benefits are desired and operations at other airspeeds reduce benefits and can actually hurt performance.

Properly designed winglets can also improve stability and control.

Once the performance of the winglet itself was optimized, attention was turned to the transition between the wing and winglet. A common application was tapering the transition area from the wingtip chord to the winglet chord and sweeping the transition area to place the winglet in the optimal position.

Sailplanes were early users of winglets after Mark Maughmer of the Pennsylvania State University developed a winglet airfoil for gliding competition. The difference between first and second place in soaring competition is often less than one percent, so even a small improvement was significant.

Once the benefits of winglets were proven in competition and airline service, improvements came rapidly. Blended winglets smoothed the transition from the wing to the winglet.

Boeing designed blended winglets for the 737 for improved short field and climb performance. (See Photo 5.) The new Boeing 737 Max 8 uses a redesigned blended winglet and added a lower winglet to improve fuel consumption for long range flights. (See Photo 6.)

Winglets have been used from every type of aircraft from STOL and crop dusters to the latest transport aircraft. (See Photo 7.)

Photo 5. Boeing 737 Blended Winglet

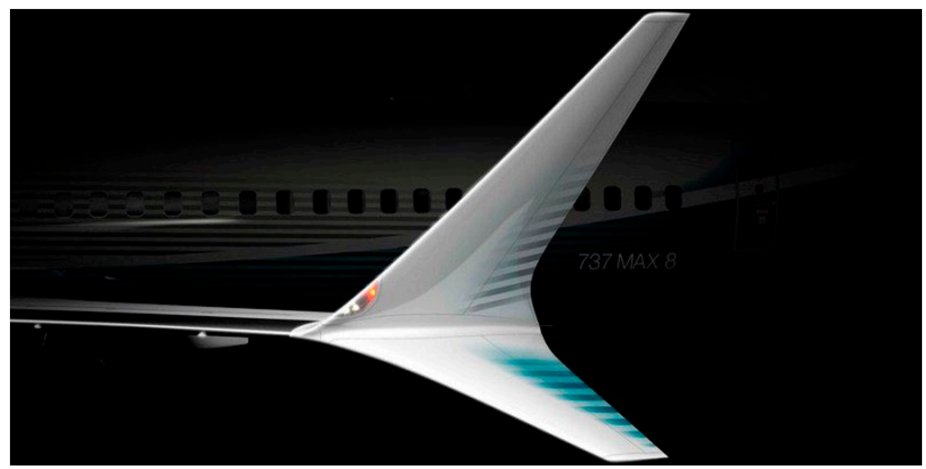


Photo 6. Boeing 737 Max 8 Winglet

Photo 7. IAI Aravia STOL Utility Aircraft

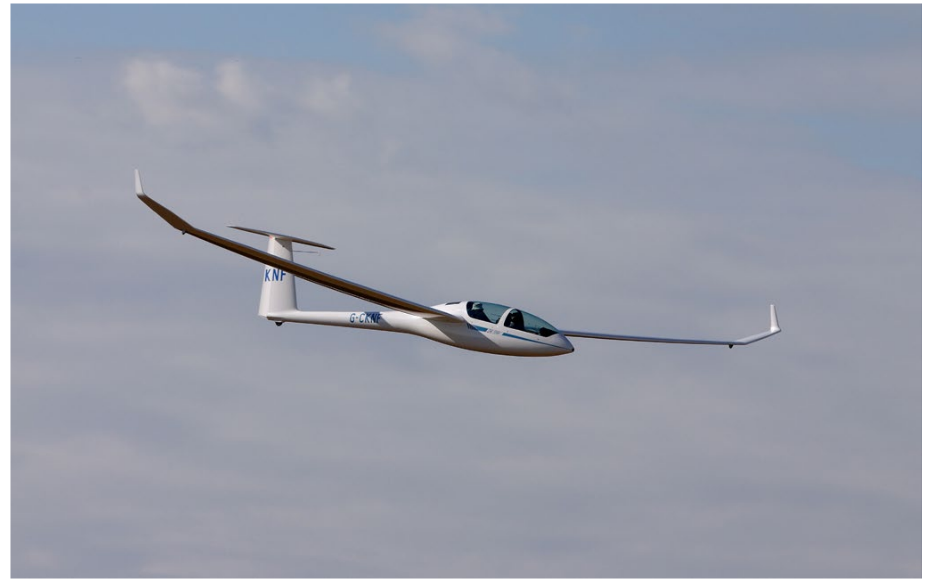


Photo 8. DG1000

By 1990, full scale sailplanes were beginning to use winglets and this led to combining winglets with raked tips and tip dihedral. A common application was tapering the transition area from the tip to the winglet and the DG-1000 used raked tips to locate the winglet in the desired position. (See Photo 8.)

The 2006 JS-1 Revelation sailplane went a step further and used a four panel polyhedral wing with winglets giving even closer approximation to elliptical dihedral using flat wing panels. (See Photo 9.)

Winglet design has taken strange paths in recent years.

Aerodynamically, winglets have always had a lot in common with racing yacht sails and America's Cup boats have gone from traditional sails to sail wings. *Aviation Week* reported that Airbus has teamed up with Oracle Team USA, winner of the 2010 and 2013 America's Cup, to develop winglets for their next A320 airliner.

Photo 9. JS3 (front), JS1 Revelation (rear)

Winglets have limited application to model sailplanes because of excess drag at speeds other than design air speed.

Not long after I started experimenting with winglets, I toyed with the idea of using controllable winglet toe out angles to get around the high drag of winglets at airspeeds other than the design point, but quickly gave up as impractical in the real world and only considered winglets for span limited classes.

The new F3RES class is the only current sailplane class that offers a real chance of useful applications of winglets. Raked and Hoerner Full Sharp wingtips are the only tip devices that offer chances for any improvement better than a simple wing span increase. Just remember that there is usually a price to be paid for most devices that offer significant performance improvements.

TANSTAAFL- There ain't no such thing as a free lunch.

Gordy Stahl's article about the F3RES class in the March issue of *RC Soaring Digest* got me wondering how a light weight Winglet Spica stressed only for high start launching and improvements in winglets and airfoils since 1978 would compare with current F3RES kits. The wide chord wing with large winglets would also help us older flyers keep two meter sailplanes in sight.

Time to design a new sailplane!

This Steppe Buzzard passed through to keep an eye on proceedings at the Two Oceans Slope Soarers 2017 Aerobatic Event.

Tom's Tips

Magnets, magnets, magnets

Tom Broeski, T&G Innovations LLC, tom@adesigner.com

Besides using magnets for holding canopies and wings to fuselages, I realized that I use magnets for a lot more.

From broken magnets from some old motors to neodymium magnets, here are just a few uses:

Calculator

Shopsmith tools and wrenches

Well worn chuck keys on my Smithy

All my grinding and buffing disks

Rules (many different places around the shop)

Adjustable wrench

Different items stay on the top of the toolbox
even when open

I even use a magnet instead of a door stop
to keep my shop door open.
(No it's not a wooden door).

That's just one half of the shop...

Bet you have many more places to stick things.

Slope Soaring Candidate

Ilyushin IL-52

<http://survincity.com/2010/09/far-bomber-il-52/>

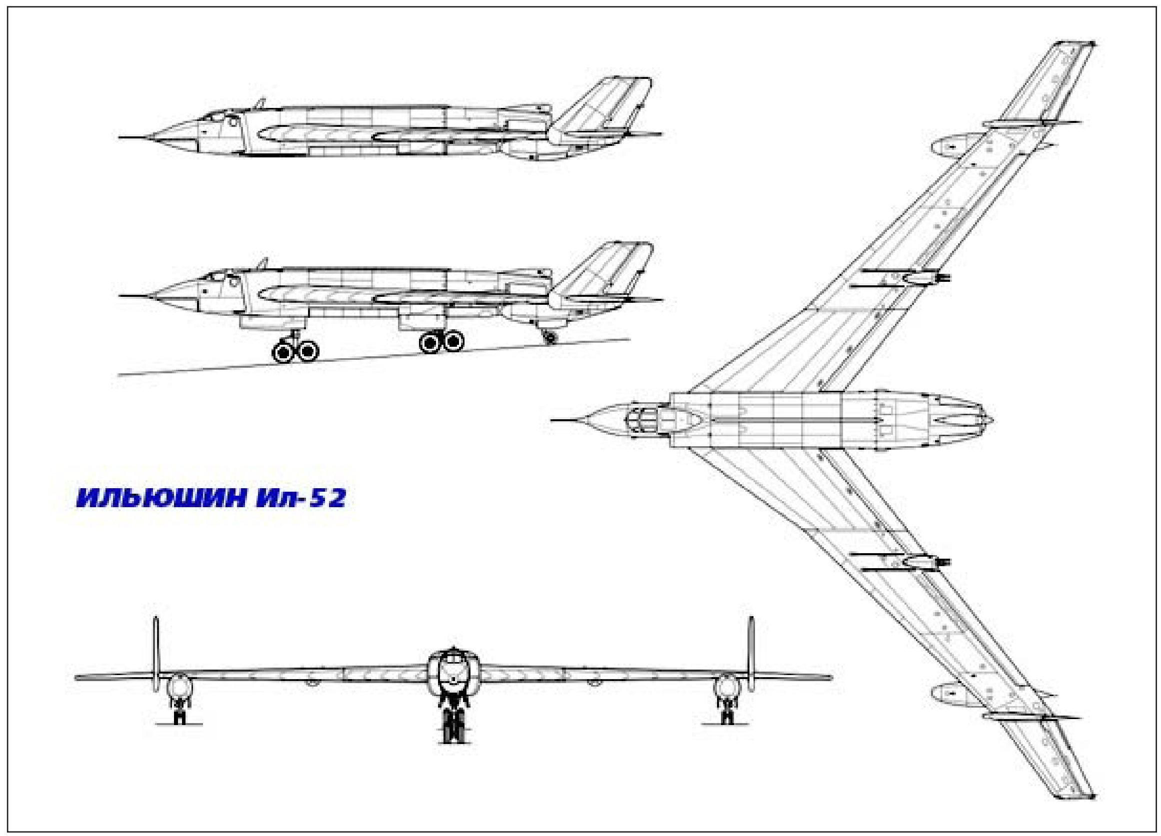
The Ilyushin IL-52 is a little known Soviet bomber which never went into production, although a single prototype was apparently built and flown.

Development began in the late 1940s with the purpose of delivering atomic weapons across continents.

America was flying the B-47 and developing the YB-60 and the B-52 at this time, and Soviet designers were looking for something similar, but the tailless IL-52 is certainly uniquely different than its American contemporary counterparts. Soviet production bombers, like the TU-95 and others, also had a more conventional planform.

The IL-52 has a number of interesting features which make modelling a challenge.

First there are the large pods well outboard on the wings. These housed the outrigger



landing gear necessitated by the tandem main gear arrangement.

Next there are the two vertical fins. These are, as the landing gear pods, situated well outboard on the wings.

Additionally, it appears from artist renderings that the IL-52 had two engines mounted within the fuselage. While the entry ducts are quite obviously on opposite sides of the fuselage, the two nozzles are oriented vertically.

The IL-52 is such an obscure aircraft that an intense scouring of the internet, including the Ilyushin web site, produced no dimensions.

We would certainly appreciate hearing from anyone who has additional information on this unique aircraft. RCSD