Electric & Glider FLIGHT Australia

Editon Number 5 December 2016

Giant Stearman conversion- glow motor replaced with electric power allowing a dummy motor - by Ian Swadling - see p.11

Editorial
by Peter Pine

Number 5 is coming to you early to catch the latest information on the F5j Trophy event to be held in Canberra, only 11 days from the time of writing! And to appeal to fliers to enter this week so that the draw can be done in advance. At the time of writing we have 26 entrants with 9 promised. It is going to be a great event. And see the host of prizes to be given away on pages 21 and 22! You will go home with some goodies - probably more valuable than your entry fee! I look forward to seeing you there!

We are desperately short of information on Electric Old Timer, so please send in information and photos of your models, details of events, and any technical reports. See Laurie Baldwin's summary of new LiPo technology in this edition, which was prompted by the need to assess if the new battery packs are suitable for EOT.

Thanks to those who contributed to this edition - event reports from Bundaberg and Maddens Plains, Mystique reports from Dave Geary and John Webster, Laurie's battery analysis, Lawrie Prest's tip on keeping your cables clear of spinning motor cans, and congratulations to Ian swadling on his giant Stearman conversion.

Finally, an appeal for information on events for 2017. Fred Lodden has given me a great list, which will be amalgamated in to the next report. Make sure your events are listed on our calendar so that clashes can be avoided, and interested fliers can attend! Until next time .....

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President's Message
by Terry Scolari

Bundaberg was a great first F5J event for Central Queensland with fliers coming down from Townsville, Evan Bengtson from Brisbane, Glen Cowan from Hervey Bay, Ross Ginder from Monto, myself from the Sunshine Coast and Peter Pine from northern NSW. A great start Bundaberg - let's keep it going!

F5J is firing with many events all over the country. You only need to look at the overflowing 2016 calendar to see that it is booming. And now with the event becoming official, a World Champs is in the near future - why not try out for it yourself?

Try F5J at your club and we will help you. The AEFA has the gear and we will support you. We will supply equipment and expertise! We have all the necessary computer files, copies of the rules, and data loggers that you can use.

The EOT rules have been under review. The EOT guys have been diligently discussing changes, and rules with a few changes are being submitted to the MAAA for acceptance, through the SAM guys. These rules will then come in to force and remain static for some time as official rules, but individual event CDs can vary the rules for local conditions. At least one EOT event is mooted for next year at Nowra, so work on adding some more to the 2017 schedule, and of course EOT will be run at the 2017 NEFR as well.

Speaking of the NEFR - it is locked in (by your voting) at the NAAS field for Easter 2017, which falls in April this time. See the calendar in this edition and mark your diaries!

If your club or organisation is planning events for next year, give us the information so that we can add your details to the 2017 calendar. It is time to set up the 2017 program and you can contact any of us for assistance. See you in the air in 2017!

See the last page for contact details for all of the AEFA Executive - let us have your feedback!

Roy Calnan launches his EOT model at the 2016 NEFR

Bundaberg F5J 18 September

The first Central Queensland F5J event was held on a rainy Sunday - six rounds were flown with 10 fliers (Evan flew Saturday) in and amongst showers. It did not rain heavily, but it rained on and off all day. We proceeded anyway and had a great day of flying in light conditions - not many thermals!

Of the 10 fliers, Evan came from Brisbane (Bundy being his home town, so a family visit was part of the schedule), Ross Ginder came from Monto (central, southern Queensland), Lawrie Prest and Glen Dawson from Townsville (a long drive), Terry Scolari from the Sunshine Coast, Glen Cowan from Hervey Bay, myself from Pottsville, and the rest were locals. Locals Derry and Darren helped time all day and were of great assistance.

Ross came first flying a Maxa, I came second with my Pulsar, and local Mark Linwood came third flying a new Euphoria on its first competition outing.

In Limited, local Colin May came first with an Aero-naut Premiant, Glen Cowan came second with a 2m and local John Arnold third with a Radian.

In the light conditions, there were very few long flights. In fact, only 11 flights out of 54 were over 9 minutes. Some heats were won with 5 and 6 minute flights.

The Bundy organisers were pleased with the day, and plan to make this an annual event, so add it to your calendar for next year and make the trip to support those keen on F5J in Central Queensland.

Images right from Annette Scolari: the usual group shot first. Then in sequence, Glen Dawson (Ava) studies the air with Ross Ginder, Lawrence Prest (Ava) with timer Darren, Terry Scolari with his Xplorer, Colin May retuns to the pits with his Premiant accompanied by John Arnold, Glen Cowan with his 2m, and yours truly with a Pulsar.

Bundaberg Day 2 - Overall Results [BASF 18/09/2016]

www.GliderScore.com

Rank	Name	≥ 2.5m	Score	Pcnt	Raw Score	Rnd1	Rnd2	Rnd3	Rnd4	Rnd5	Rnd6	Drop1
1	GINDER, Ross		**4941**	100	5735.1	941	1000	1000	1000	1000	794.1	794.1
2	PINE, Peter		**4732.8**	95.79	5601.6	943.6	868.8	898.5	1000	890.7	1000	868.8
3	LINWOOD, Mark		**4501**	91.09	4956	618.4	1000	950.2	455	957.3	975.1	455
4	DAWSON, Glen		**3926.9**	79.48	4175.8	1000	248.9	1000	416.7	1000	510.2	248.9
5	MAY, Col	1st	**3652.6**	73.92	4200.6	553.8	869	752.3	548	606.7	870.8	548
6	SCOLARI, Terry		**3505.5**	70.95	3951.7	446.2	549	820.6	986.4	650.4	499.1	446.2
7	PREST, Lawrie		**3383.9**	68.49	3703	910.3	483.2	605.3	385.1	319.1	1000	319.1
8	COWAN, Glen	2nd	**3005.7**	60.83	3005.7	1000	553.1	341.4	0.0001	509.3	601.9	0
9	ARNOLD, John	3rd	**2608.4**	52.79	2939.1	587.3	510.1	560.2	375.7	330.7	575.1	330.7
10	EVAN, Bengtson		**0**	0	0	0	0	0	0	0	0	0

Aircraft suitable for F5J: Amongst the **moulded models** are the Euphoria, Maxa, Pike Perfection, Xplorer, Kappa, Supra

Amongst models with **built up structure**: the Mystique makes a good full house introduction - see photo to the right - Mystique being launched at Lake George.

See write-ups on the Mystique p.8-10

Also the Ava range and the Pulsar range.

In ≥ 2.5m for Limited F5J, consider the fully moulded Scorpion, The Kappa 2.0 and 2.5m, Orion (Mini-Xplorer), and also the Radian!

Support F5J on Facebook

Recently started - "F5J Australia" Facebook page:
For sharing information about events, models and happenings.
Join the Facebook page and keep in touch with F5J.
Share your own information - local events, set-ups in your aircraft, F5J techniques that work!

HSL F5J 18 September - same day as Bundaberg

Phil Stevenson (3rd place) reports - weather forecast kept many away: Maddens was cloudy with a light northerly, and rain at times. We delayed starting, had some drizzle for a few rounds, and stopped for lunch when it got heavier. Then we had 2 dry rounds after lunch, 6 in total. It started raining heavily as we drove home.

There were 14 entrants, and not much lift. Jack Murphy flew his Explorer, with his F3J wing, because he thought it might get windier. He just had a better minimum sink than most and lasted slightly longer with slightly lower launches, so won almost all his rounds (1st place). Don Farrar (2nd place) flew his 3.6 Pulsar. I flew my Kappa in to third place.

Lots of 6 minute rounds, so we got through 6 rounds x 2 groups - OK in the disrupted day. No low launches were successful. I ran 30 seconds every flight, but never went over 195m. We all had a good day and were pleased we persevered when we could have easily canned the day at 9.30am.

Colin Woodward (red shirt) presenting awards in the rain. Outright winner, Jack Murphy, left rear in yellow, Rob Watson Limited winner (head down) and Limited 2nd place Ladislav Safarik right rear. Fred Lodden photo (3rd Limited)

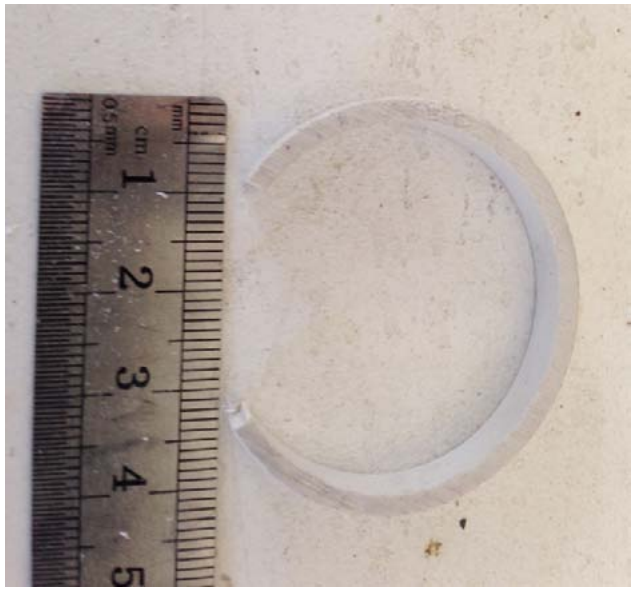
Rank	Name	2.5m?	Score	Pcnt	Raw Score	Rnd1	Rnd2	Rnd3	Rnd4	Rnd5	Rnd6	Drop1
1	MURPHY, Jack		**5000**	100	**5965.7**	1000	965.7	1000	1000	1000	1000	965.7
2	FARRAR, Don		**4751**	95.02	**5469.7**	1000	718.7	1000	1000	778.5	972.5	718.7
3	STEVENSON, Phil		**4470**	89.4	**5225.7**	816.2	886.5	801.1	966.2	755.7	1000	755.7
4	WOODWARD, Colin		**4385.2**	87.7	**5022.7**	642.9	1000	637.5	921.5	830.9	989.9	637.5
5	LEITCH, Dave		**4190.2**	83.8	**4803.6**	841.9	700.1	901.9	969.5	613.4	776.8	613.4
6	WATSON, Robert	2.5	**3947.3**	78.95	**4596.3**	738.7	678.5	649	709.4	1000	820.7	649
7	SMITH, Trevor		**3841.4**	76.83	**4409.9**	642	644.8	806.5	982.2	568.5	765.9	568.5
8	SAFARIK, Ladislav	2.5	**3792.1**	75.84	**4428.7**	838.2	693.5	770.2	748.2	742	636.6	636.6
9	LODDEN, Fred	2.5	**3750.5**	75.01	**4231.9**	749.1	1000	502.7	779.2	481.4	719.5	481.4
10	WEATHERSTONE, Stephen	2.5	**3696.9**	73.94	**3696.9**	876.1	684.2	616.9	630.7	0.0001	889	0
11	ANDREWS, Gary		**3235.7**	64.71	**3679**	667.3	542.6	807.8	686.1	443.3	531.9	443.3
12	WADESON, Dave	2.5	**2732.8**	54.66	**3142.6**	465.6	723.4	447.1	564.8	409.8	531.9	409.8
13	WOODWARD, Ken	2.5	**2247.6**	44.95	**2572.9**	430.1	365.5	325.3	460.7	621.7	369.6	325.3
14	ILLYES, Tom	2.5	**495.3**	9.91	**495.3**	0.0001	495.3	0	0	0	0	0

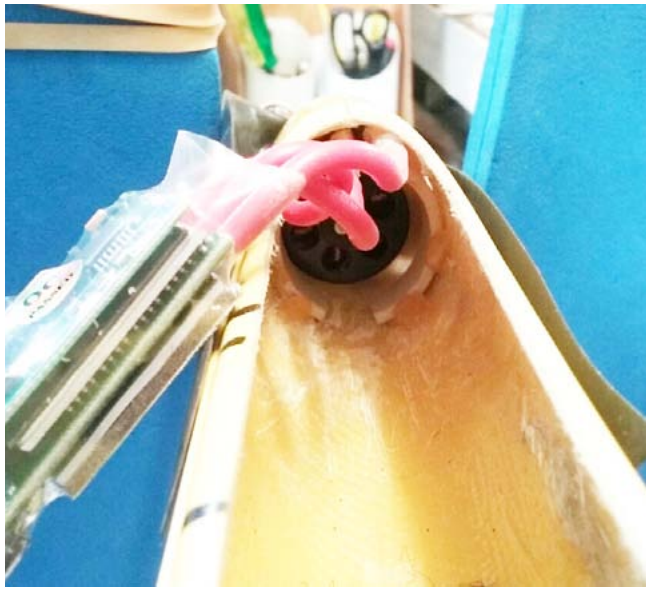
Breaking news:

F5J becomes an official FAI event on 1st January, 2017!

No longer provisional - watch for a World Championships and start practising!

The F5J Trophy event in Canberra, Picton Cup Rnd2, Sailplane Expo and F5J at the NEFR have been logged for listing on the Slovakian leader board.





Construction Hint - how to hold those wires out of the way of the spinning can of an outrunner motor

by Lawrie Prest, Townsville

Lawrie has shared his method of securing the three cables from his outrunner motor hard up against the fuselage side to keep them out of the way of the spinning can. Lawrie bought a small piece of PVC pipe from Bunnings and lopped off about 1cm. He then removed a section from the disc - this provided a part-circle that he could spring in to place inside the fuselage, holding the wires up hard against the fuselage side. He secured the piece of pipe with hot glue. To remove the motor, simply cut through the hot glue and remove the piece of pipe. If you have any tricks like this, send them in and share them - we all need as much help as we can obtain!

Tip on Fitting Motors

Have you ever had trouble lining up an outrunner motor inside the nose of a fibreglass fuselage? They alwasy seem to twist and turn and you cannot locate those pesky threaded holes for the screws.

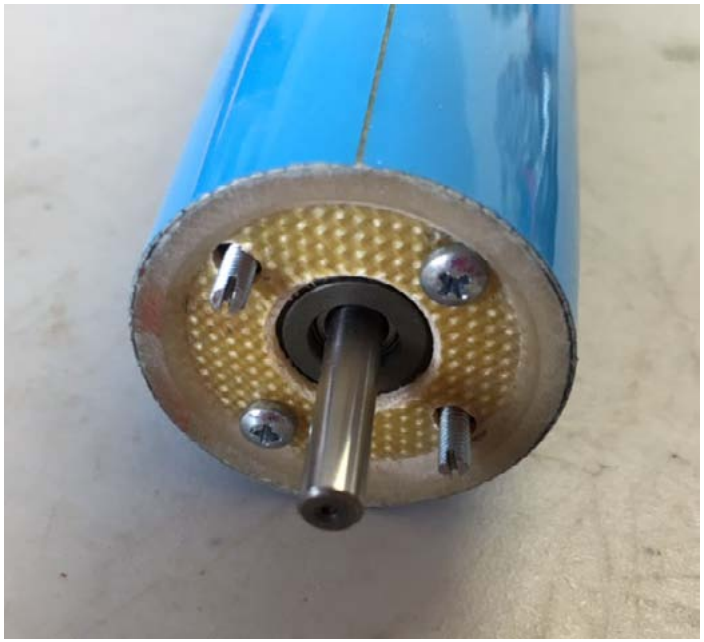
Here is a solution - take two 3mm bolts (or whatever size you are using to fix your motor) and carefully place them in a vice and cut off the heads. using a Dremel. Then use your cutting disc to cut slots in the end of the bolt (to accept a screwdriver).

Hand screw these headless bolts in to your motor as in the photo. Drop the motor into the thin glider nose and line up the headless bolts to come through two of the holes you have prepared. While the motor is sitting in place, fit the other two screws as is the photo.

Now just remove the headless bolts using a screwdriver in the slots you cut in the end of the bolts. Replace them with screws to locate the motor with all four bolts!

Send in any tips you have to make our assembly, construction, or flying easier - we will share with all!

Image shown here is a Pulsar Compact fuselage that already had the nose former fitted.



F5B at Cootmaundra

The F5B group have arranged an event at the NSW State Field on 2-4 December, with the field available for practice on Friday.

They have designated this event both the Dave Hine's Memorial Trophy and the MAAA Nats. The Nats are being run as a split Nats organised by Victoria, and the F5B guys have successfully negotiated this event to be the official MAAA Nats.

If you have never seen this Formula 1 version of electric gliding you need to go along to see it - and help out with the many jobs. It is a dual task event, with both tasks being performed in the one flight. Specialist equipment is required, and speed laps are ballistic!

For information - contact Brett Solanov:
bsolanov@dodo.com.au

EOT model landing at the 2016 NEFR - fuselage lit up by the sun! We need EOT info for publication - send in your reports!

E-flite Mystique 2.9 metre, full house sailplane.

by David Geary, Burliegh Heads

The kit is a really well made and well finished straight out of the box. Ailerons and flaps are pre hinged and an integral part of the covering, so the most work required for the airframe was the dry fit, and then final fit of the rudder and hinges, the fitting of control horns for all surfaces, and to sort the particular requirements for control rods of flaps and ailerons.

After check fits for clearance of servo control arms within the wings, 10 mm thick, 5 kg servos were epoxied to respective aileron and flap mounting plates. Once these plates were screwed in place, aileron control rods were fashioned.

Instead of using clevises at both ends of the stock (thick and heavy) OEM control rods, I chose to use 2/56" Dubro wire, with a 'z-bend' at the servo control arm end, and a single clevis at the control surface end for flaps and ailerons. After trials for size and shape, two aileron control arms were made with minimal fuss, with clevises located outside the wing using the threaded end sections.

The recommended stock set up for flap control rods seemed a little peculiar, so a few attempts were made with scrap wire to fashion suitable wire versions. This resulted in a little more work, and experiments with bends in different locations

Photo of Dave Geary hiding behind the wing of his Mystique at the Lower Tweed MFC field

were attempted. The aim was to achieve full throw for the flaps, but minimise any severe bends and potential bind points.

A little elongation of the control rod exit slots from the main wing was required with a small rat tail file, but a final low angle, slightly 's'-shaped control arm was fabricated. Once the prototype was completed, the final flap control arms were fabricated from 2/56" Dubro wire stock. Again, I chose to fit a z-bend at the servo control arm end, and use one only clevis at the control surface (flap) threaded end, outside of the main wing area.

Rudder and elevator servos and control arms were fitted with minimal fuss (Hitec HS-82 MG's). However, when fitting the control arm keeper to the elevator control arm wire through the bell-crank at the base of the rudder, a pair of bent, long nose pliers will make your life easier.
I have been a bit of a squirrel with parts and 'bargains' over the past few years, so with every build I complete, I now try to utilise existing parts

from under the bench. The Mystique was to be no different in this respect.

I conducted some preliminary bench tests, evaluating a variety of different motors I had available, and narrowed the potential motor selection for the Mystique down to two motors that seemed most suited for size, weight, and performance. The motors I chose to bench test in detail were:

- E-flite Power 25 870 kV (recommended by manufacturer)
- Turnigy NTM 4238 750 kV

Propeller tests were made on both of these motors with the following folding props:

- E-flite stock 14 x 8 (recommended by manufacturer)
- Aeronaut 14 x 8 carbon
- Aeronaut 14 x 9 carbon
- Aeronaut 14 x 10 carbon

Three and four cell setups were tried with different motor and propeller combinations. Tests were conducted from zero throttle to a WOT run for 30 seconds (via a 3 way switch on DX9 to 30% then 100% throttle input). Data was logged with the Castle ICE 50 Amp ESC, and maximum amps, watts, RPM, and temperature recorded during this run period.

The big surprise was the difference in test bench performance of the stock E-flite 14 x 8 propeller, when compared to an Aeronaut 14 x 8 carbon prop, on both 3S and 4S bench tests, and on both motors (see figures next page). The E-flite Power 25 was also underwhelming during these tests. All tests were completed with a freshly charged battery and cool motor.

The final power set up combination selected for use in the Mystique was:

- Motor: Turnigy NTM 4238 750 kV
- Prop: Aeronaut 14 x 10 carbon
- ESC: Castle ICE 50 Amp
- Battery: 3S 2200 mAh 30C

Final motor installation of the NTM 4238 motor required a swap out of the stock length shaft for a longer 70 mm shaft. This allowed the placement of an 8 mm thick aluminium 'shim' in front of the motor (an old motor 'x' mount modified to fit between the fuselage bulkhead and the front of the motor can). This allowed some extra wire and cooling clearance around the 42 mm motor can back inside the fuselage, by pulling the motor mount position back from the bulkhead and the slightly narrower nose of the fuselage.

Once final assembly and construction was complete, CofG was set without any weight required, and maiden flights were completed. It seemed to take a while getting the set up correct for straight and level flight. I seemed to have trouble with the incidence angle of the all-moving tailplane, and had a couple of interesting first flights (including unintentional inverted flight, and complimentary brown shorts) until I got the angle of attack correct.

Once straight and level flight was achieved, the final tailplane angle of incidence seemed a little off when compared to the advised build position, even though the CofG was spot on.

The selected power and propeller set up used makes 480 watts while pulling a maximum of 40 amps at 100% throttle input. Hand launch and moderate climb outs result in altitudes between 180-230 metres from a 30 second motor run (altitude logged with Altis V4+ data logger). Motor and ESC data is logged via the Castle ICE ESC. There are future plans in place to run Spektrum TM10000 telemetry for altitude from the Altis data logger.

Utilising the glider setting options available on the Spektrum DX9 TX was of great appeal, and once straight and level flight was sorted out, I began to experiment and fine tune different flight modes and settings - launch, cruise, thermal, speed, and landing modes (crow). These settings are mostly complete, but as always, are still being fine-tuned. It's been great getting to know the plane, and getting to explore and learn the DX9 programmable capabilities that compliment it. Use 'cruise mode' and straight and level flight as a base from which to start is my suggestion.

Thank you David for your report! (Ed.)

Bench Tests of Motors and Props for Mystique by Dave Geary

Now here's a man who does serious testing! What a range of tests Dave has done and documented! We could all learn from Dave's diligence and not work in the dark. I remember Peter Blomaart would always encourage serious testing so that we were "not working in the dark". Electric Flight may be the dark side, but equipped with data like this we can make sensible decisions! You can now understand Dave's comment about the standard prop compared to the Aero-naut - standard E-flite 14x8" prop drew 20A and produced 232W with the NTM motor, but the Aero-naut 14x8" drew 32A and produced 389W on the same battery!

Electric motor specs	**Power 25 (870 kV) Mystique**	**Power 25 (870 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**	**NTM 4238 (750 kV) Mystique**
kV	870	870	750	750	750	750	750	750	750	750	750
weight motor	190	190	169	169	169	169	169	169	169	169	169
cells rated	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S	3 - 4S
cells running on test	3S 2800 mAh	4S 2800 mAh	3S 2800 mAh	4S 2800 mAh	3S 2800 mAh	4S 2800 mAh	3S 2800 mAh	4S 2800 mAh	3S 2800 mAh	4S 2800 mAh	3S 2800 mAh
cell volts	12.6	16.8	12.6	16.8	12.6	16.8	12.6	16.8	12.6	16.8	12.6
Motor A constant	32	32	50	50	50	50	50	50	50	50	50
Motor amps (burst)	44	44	55	55	55	55	55	55	55	55	55
ESC type	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50	Castle 50
ESC Amps (constant)	50	50	50	50	50	50	50	50	50	50	50
ESC Amps (burst)	60	60	60	60	60	60	60	60	60	60	60
ESC Amp max actual	45	50	20	29	32	48	41	56	40	61	40
CASTLE TEMP MAX	27	53	42	31	31	44	45	70	47	52	44
Motor watts rated	600	600	785	785	785	785	785	785	785	785	785
Motor watts V x A	567	840	252	487.2	403.2	806.4	516.6	940.8	504	1024.8	504
Watts (actual)	224	310	232	465	389	754	477	794	488	925	445
AUW actual (kg)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
AUW actual (lb)	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97	3.97
P:W (watt/pound)	56.45	78.12	58.46	117.18	98.03	190.00	120.20	200.08	122.97	233.10	112.14
prop running	14 x 8 eFlite	14 x 8 eFlite	14 x 8 eFlite	14 x 8 eFlite	14 x 8 aero	14 x 8 aero	14 x 9 aero	14 x 9 aero	14 x 10 aero	14 x 10 aero	15 x 10 aero

Mystique 2.9 Metre Electric Glider

Report by John Webster, Canberra

Early flights with the Mystique were quite rewarding, and one learnt to handle its characteristics fairly quickly, especially its ability to pick up speed rapidly in a shallow dive.

However, after one hand launch the plane developed what seemed like a severe wing flutter and came down quite hard.

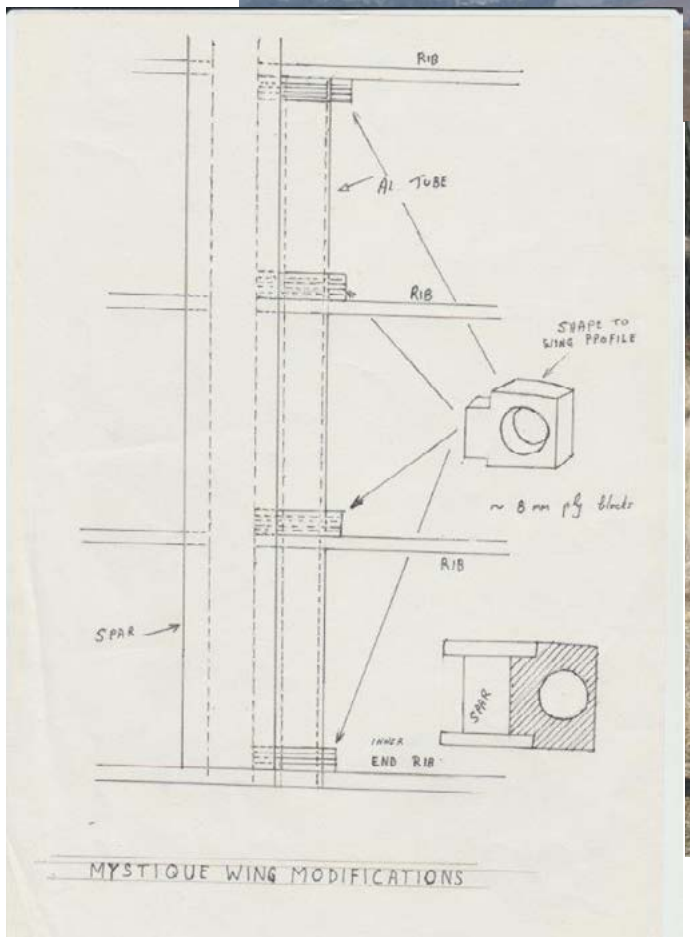
Inspection showed cracked balsa sheet covering near the wing root. On removing the sheet balsa, it could be seen that the aluminium tube which carries the carbon wing joiner had broken away from the spar, and seemingly had not been secured very well. After some effort, the tube was removed entirely and three or four ~ 8mm ply sections were made to fit over the tube, and keyed into the spar next to the ribs (see drawing), each one being different to account for the wing dihedral, and shaped to follow the wing profile.

The sections between the ribs and sections were boxed in with balsa and epoxy. The same treatment was then applied to the other wing, together with some extra strengthening to the dihedral brace which showed signs of minor cracking.

All this added a little to the weight – it now weighs 2395g all up, but is now a pleasure to fly over a range of speeds. It slope soars and thermals very well.

I am now experimenting with 'crow' braking to slow it down even more on our restricted field. Lake George is looking very soggy at the moment so I'm looking forward to some warmer, drier weather in the spring.

Sketch below shows modifications John made to the wing - now flies beautifully (right). - Lake George flying site.



Maiden flight of John's Mystique

Giant Stearman converted to electric power
by Ian Swadling

The Stearman had its first flight in its new iteration as an Electric flyer. It was a perfect flight straight away from lift off to the trimming, circuits and some gentle manoeuvres to prove its flying characteristics, The day was sunny, the wind was about 12-15 kmh and stronger gusts. It lifted off in less than ten metres and just kept climbing steeply under full power, which as I will show later is considerable.

The story behind this successful conversion is that I purchased it second hand with a glow engine fitted. it was in a fair condition with some damage to the covering, and missing some flying wires.

For me, this was going to be a bit of a challenge, as I could not find any information about the kit it was built from. This made life difficult as to structural details, C of G placement, battery access, and so on.

As I already had a suitable motor, a Scorpion 4025-10, 512 kV, this was my choice. The issue that meant days of cogitating, head scratching, and guesswork was how to mount everything in an airframe that would not strain the structural integrity (too much), and where to start. The first step was to strip out all the original engine and tank components so I could get a good look at the airframe around the front section. I then bit the bullet and stuck the knife in where I thought a front hatch would work, removed the hatch section and had a good look inside. I was flummoxed when I saw the wire work inside the nose for the wing cabanes and undercarriage. After more thinking, I worked out what I could remove and relocate, and what I couldn't. I removed some wire mountings that were part of the undercarriage, and decided that I would have to leave the front cabane wire that runs across the front of the fuselage, although it would restrict my options for battery placement. In the end it didn't matter much, as you will see from the pictures that the battery is as far up the front as possible and positioned in an upright

The Stearman in its original form with a huge glow motor. Ian Swadling removed the motor and all its accoutrements. In went a large Scorpion motor and all the electric bits. See the front page for the new, electric version. See the next page for some of the modifications.

Send information and photos of your latest electric or glider project (and EOT as well) to be featured in this E-magazine - let us all benefit from information sharing!

orientation. This to gain as much nose weight that I could get with the largest battery possible to fit. From that stage I started cutting out the wood to enable the battery and esc compartment to be formed. Unfortunately, I had to mount the ESC next to the battery in the nose, as this was the only spot that would allow sufficient cooling past the ESC.

To achieve balance it was necessary to fit all components as far to the front that I could. The picture of the battery compartment shows the battery, and esc in place. Hidden in the sides of the battery and ESC are 2 flight packs of 2000mAh each. I have been running dual Rx packs for a while in all large aircraft I fly since I saw a Sopwith Camel take off on its own when the single battery collapsed while the engine was running and the failsafe wasn't! (safe).

The whole reason for converting to electric power was to be able to present a more scale looking model with a reasonably scale radial engine in front, instead of a glow engine sticking out like a misplaced lump of metal.

To achieve this, I obtained a couple of radial engine blanks from Frank Tiano Enterprises. They supply a range of engine model castings in plastic in a range of types and sizes. I used a 1/6th scale moulded dummy motor, making the engine up by gluing the 2 blanks together to make it look like a complete engine. It sure won't fool any one that knows radial engines, but it does look quite effective when finished off with pushrod tubes (see image on front page), plug leads, etc. and painted. Before I glued the 2 blanks back to back, I also hollowed out the barrel sections and filled the hollows with as much lead that I could to get more weight up the front.

You wouldn't believe it, I just found out that it is from a Sterling kit, circa 1968, and found a plan copy. That would have been a big help in the beginning. After finishing the motor/esc/ batteries installation, I got to work on the airframe. replaced and patched the tears in the covering, made a new rigging wire, and replaced the servos, switches and a few other minor things. At the end of it all, this is how it finished up specs wise.

Wing span - 64.5 inch/1640 m.m.
Length - 49.6 inch/1260m.m.
Weight (Incl. battery) - 5.4 Kg./11.90 lbs
Motor - Scorpion S-4025-10, 512kV
ESC - Turnigy Sentilon 100 Amp Opto HV
Receiver - Spektrum AR6210+ 1 Satellite
Battery - Zippy 5000-6S(subject to change, maybe to 5S)

I had some power and performance figures, but I must have made some errors in scribing. Suffice to say it had plenty of get up and go and flew on just over ½ throttle.

Max amps with the APC-E 16X8 prop used was 91 Amps, 1972 Watts, thrust 4.9 Kg, but I need to double check some of these figures due to some discrepancies. *Well done, Ian! (Ed.)*

***Above** - Image of the major surgery Ian executed on the originally glow-powered Stearman by Ian.*
***Below** - battery placement with Rx batteries too!*

LIPO Literature Review and Analysis

by Laurie Baldwin

New varieties of batteries are being marketed and their characteristics may impact how energy handicaps are applied to Electric Old Timer competitions. This review will examine information relating to 'HV LiPos' and Graphene cells.

HV

Two principle and trusted sources provide the bulk of the information, Revolectrix and Hyperion.

Energy

To begin, this simple and brief review of energy handicaps is provided to highlight the relevance of discussing nominal voltages.

In IC Old Timer events, 'fuel' is an important parameter. Fuels have a defined energy value.

Wikipedia: "The heating value, or energy value, or calorific value of a substance, usually a fuel…is the amount of heat released during the combustion of a specified amount of it. The energy value is a characteristic for each substance.". Consequently, addressing electrical energy is seen as an important way of providing a correlation between IC and EOT events.

A common unit of electrical energy is the kilo watt-hour (kWh). Watts are the product of volts and amps, so the unit of measurement could be expressed as 'volt/amp/hours'. For a battery, the combination of nominal voltage (volts) and capacity (amp/hours) provides a basis for specify the energy it holds.

EOT events include a specific energy allocation, expressed in cell.mAh. Allocations are based on cell nominal voltage where a LiPo is 3.6V/cell and an A123 (or LiFe) is 3.3V/cell. LiPo cells have become the default standard and the tables in the "Rules" provide a quick and simple reference. Some events also define energy in terms of watt.hours, but this parameter is rarely used.

Revolelectrix

Revolelectrix is promoting a range of cells it labels 'blends', as follows:

Blend 420
Blend 427
Blend 435
Blend 455

The numerals reflect the cell's maximum charge voltage, 4.20V, 4.27V, 4.35V, and 4.55V respectively. 455 cells are forecast for delivery in December 2016; the others are available in Singapore now. Currently all higher voltage cells have a capacity over 2400mAh.

Hyperion

Hyperion is advertising G6 High Voltage Lithium packs. They indicate that while the G6 packs can be charged to 4.2V per cell they can also be charged to a maximum of 4.35V per cell. Hyperion data sheets refer to G6 cells as 3.8V LiPo and include the following note: "They are available in 2S 900mAh and up."

Other Suppliers

Turnigy is advertising that 'Bolt' batteries can be safely charged up to 4.35 volts per cell. Thunder Power also supply a 'High Voltage' series of cells, also advertising 4.35v per cell. Another brand, Lumenier, notes 'High Voltage batteries are designed to hold a voltage of 4.35v per cell instead of the standard 4.2v per cell. The addition of this extra voltage from a full battery gives you more power for your aircraft.'

Nominal Voltage.

Many sources state the nominal voltage of a 'standard' lithium polymer cell as 3.7V and fully charged at 4.2V. Extrapolating from the Hyperion data sheets, their HV cells could be rated as 3.8V nominal and 4.35V fully charged. Revoelectrix information about nominal voltages is not clear but maximum voltages are published. By comparison LiFe is 3.3V and 3.8V respectively while Li-ion is 3.6V and 4.2V.

Rules Implications

Based on the data found, HV cells have a higher energy content than standard cells of the same capacity. At present the rules do not break down

allowances for any cells other than LiPo or A123. However, the Watt.Hours parameter is nominated for other cell chemistries and this factor could be applied, albeit with less convenience than the look up table.

Graphene

Scientifically, Graphene is an allotrope of carbon. Scientists note that "batteries can be enhanced by introducing graphene to the battery's anode and capitalizing on the material's conductivity and large surface area traits to achieve morphological optimization and performance."

In simple terms, graphene does not alter a cell's energy density, nominal voltage or maximum voltage. Its role is to reduce internal resistance and therefore operate more efficiently.

Graphene cells are currently being marketed by Turnigy.

Rules Implications

Based on data found, Graphene cells conform to the characteristic of "standard" LiPo packs.

Last week for entries to the Australian F5J Trophy event to be held at the NAAS field 29-30 October

Send in your entry now!

Graphene Packs – hype of not?

by Laurie Baldwin

I'm sure almost everyone knows that Andre Geim and Konstantin Novoselov were winners of the 2010 Nobel Prize in Physics "for groundbreaking experiments regarding the two-dimensional material graphene". So you probably also know that graphene is an allotrope of carbon in the form of a two-dimensional, atomic-scale, honey-comb lattice in which one atom forms each vertex. (I missed that news too.)

Graphene could be one of the 'wonder' materials for future battery production. "Batteries can be enhanced by introducing graphene to the battery's anode and capitalizing on the material's conductivity and large surface area traits to achieve morphological optimization and performance." (You probably knew that too). Simply put, by using graphene, packs should deliver more power, longer.

Being somewhat of a non-believer in marketing-speak, I decided to buy some 2S 1000mAh packs to try out in my Texaco model, a 70% Lanzo Bomber. They seemed to give it a bit more zip, but was that my imagination or not?

Prompted by Mike's request for an article, I dusted off my Emeter II and RDU, collected some freshly charged batteries, and went flying with my Bomber to get some quick and dirty data.

The test items:
Rhino, 2S, 1050mAh, 25-30C, 71gms, currently $6.59, purchased circa 2010, and a bit puffy.

Nano-Tech, 2S, 1000mAh, 25-50C, 60gms, currently $9.66, probably about four years old.

Graphene, 2S, 1000mAh, 65-130C 84gms, currently $13.55. By the way, the supplier notes that graphene packs only require a standard LiPo charger.

Plan was one flight for each battery type, with three motor runs in each flight.

Conditions, ~12degrees, wind ~11-15kph, clearish skies. In other words, reasonable for EOT.

I've extracted and refined in-flight data for just the time the motor was running, for Volts, Amps, mAh Out, and Altitude

Flight 1 Rhino
Averages 6.5V, 16.5A. 415mAh used. 753 ft climbed. 1:31 motor time.

Flight 2 Nano-Tech
Averages 6.6V, 16.8A. 424mAh used. 780 ft climbed. 1:30 motor time.

Flight 3 Graphene
Averages 7.3V, 19.9A. 499mAh used. 1015 ft climbed. 1:29 motor time.

Perhaps 'height gained per unit of energy' is a good basis for comparison for a Texaco application.

Rhino – 1.81 ft/mAh
Nano-Tech – 1.83 ft/mAh
Graphene – 2.03 ft/mAh.

For my model, based on its 1000 mAh handicap, theoretical potential heights would be 1814 ft, 1839 ft, and 2034 ft. So there is a performance improvement, in the order of 10-12%, but with a cost and weight penalty.

While my Bomber wasn't in 'Duration' configuration, looking at an alternative parameter, perhaps 'Height gained per second of motor run', is useful too.

Rhino - 8.4ft/sec
Nano-Tech - 8.6 ft/sec
Graphene - 11.4 ft/sec
Around a 30% improvement?

My conclusion: I don't think I'll be buying graphene packs for my general flying, but for competition they are certainly worth considering. They do deliver more power.

Please send information on your glider, electric glider and EOT events so that they can be featured in this publication!

Draft 2017 Gliding/F5J Calendar

2017 Glider/F5J Events Calendar

Produced by the AEFA to promote F5J & Gliding **Full Year Version**

Key - green for F5J events, red for NSW school holidays, **HSL** stands for Heathcote Soaring League

Date	Holidays NSW	Flying Events	Notes
January			
22-Jan	RCGA event	**Victorian F5J**	Diggers Rest
26-Jan	Australia Day		Thursday
26-27 Jan	Sailplane Expo	**Stand Alone F5J 1.5 days**	Armidale
27-29 Jan	Sailplane Expo	Open Thermal	Winch launch, DLG
30-Jan	NSW Schools return		
February			
12-Feb	RCGA event	Victorian Open Thermal	Diggers Rest
March			
11-12 Mar	F3J Open	Milang Thermal	South Australia
26-Mar	RCGA event	**F5J VIC State Championships**	Diggers Rest
April			
7-Apr	NSW Schools break up		
9-Apr	RCGA event	Victorian Open Thermal	Ballarat, Victoria
14-17 April	Easter	**NEFR at NAAS**	AEFA Rally Canberra
25-Apr	Anzac Day		
26-Apr	NSW schools return		

Draft 2017 Gliding/F5J Calendar continued

May			
7-May	RCGA event	**Victorian F5J**	VARMS tbc
21-May	RCGA event	Victorian Open Thermal	Diggers Rest
June			
10-12 June	Queen's Birthday	**LSF Tournament**	Jerilderie - includes F5J
30-Jun	NSW Schools break up		
July			
2-Jul	First Round	**Picton Cup**	Appin NSW
18-Jul	NSW Schools return		
August			
September			
17-Sep	Tentative	**F5J Central Queensland**	Bundaberg
22-Sep	NSW Schools break up		
October			
9-Oct	NSW Schools return		
19-Oct	Tentative	**LARCS F5J**	Loganholme, Brisbane
28-29 October	**F5J Perpetual Trophy**	**F5J Annual Tournament**	TBA
November			
19-Nov	Tentative	**Picton Cup**	Appin
3-Dec		Ted Swan Cup	Goulburn
15-Dec	NSW Schools break up		

Gliding/F5J Calendar

Send in your entries for the calendar as soon as your club or organisation decides on dates - let's keep this calnedar going to avoid clashes!

Use the 2016 full year calendar to see who ran events and when they ran them last year - try to communicate with those who ran events and negotiate dates. If you need a copy of the 2016 calendar, send me an e-mail and I will forward one to you: ppine@northnet.com.au

Events remaining this year:

29-30 October
Australian F5J Trophy event at NAAS field near Canberra - entries close 22 October.
Send in your entry now!

13 November
Millennium Cup at Nowra - contact Fred Lodden for this event (0418) 443 804

20 November
Picton Cup F5J Round 2 at Appin Club Field - entries taken on the day

27 November
HSL Club competition

4 December
Ted Swan Cup at Goulburn

The Australian F5J Trophy

Establishing a perpeptual F5J trophy in Australia. First event to be held at the NAAS field near Canberra
Presented by the AEFA in conjunction with the NAAS Club

Two days of flying 29-30 October 2016
Two classes - Open F5J and Limited F5J

Dave's Toys for Big Boys Open F5J Trophy

First prize:
Hyperion Duo Charger
www.hyperionaustralia.com.au

Model Flight Limited F5J Trophy

First prize:
Spektrum DX8 Radio Set
www.modelflight.com.au

Continued next page .....

F5J Trophy Flier continued .....

Other Sponsors:

Monaro Hobbies	www.coltaylormodels.com.au
Christian Traders	www.christiantraders.com.au
flyelectric.com	www.flyelectric.com
Albury RC Models	www.alburyrcmodels.com.au
XC-RC, Melbourne	www.xc-rc.com.au
Sky Soaring Robots	www.skyrob.com
Stan Rucinski	www.naas.org.au
Alan Mayhew	http://varms.org.au
AEFA	www.aefanet.com

Product types distributed to Participants:

Electric Motors	Fibreglass cloth
LiPo Batteries	Aliphatic Resin
Battery Checkers	Super glue
Glider kits	Epoxy Resin
Servos	Folding prop blades
Servo leads	Servo cable
Spinners	Speed Controllers

Pre-registration required - Entries close 22 October - see the AEFA web site for a registration form:

www.aefanet.com

Prizes for placegetters - and a give-away of products by draw from the hat for all competitors - $50 entry fee

Complimentary tour of Australian War Memorial storage facility for attendees Friday 28 - details on web site & in EGFA magazine
Data loggers available for loan - just bring your electric glider. Food available on the field.
Enjoy the great NAAS site - camping permitted $15 per night - toilets and shower provided.

Both perpetual trophies for the Australian F5J Trophy event are pictured to the right - they stand 300mm high and have our laser engraved logo etched on to clear acrylic - both worth winning! Photo by David lucas.

Last chance to enter the F5J Trophy Event

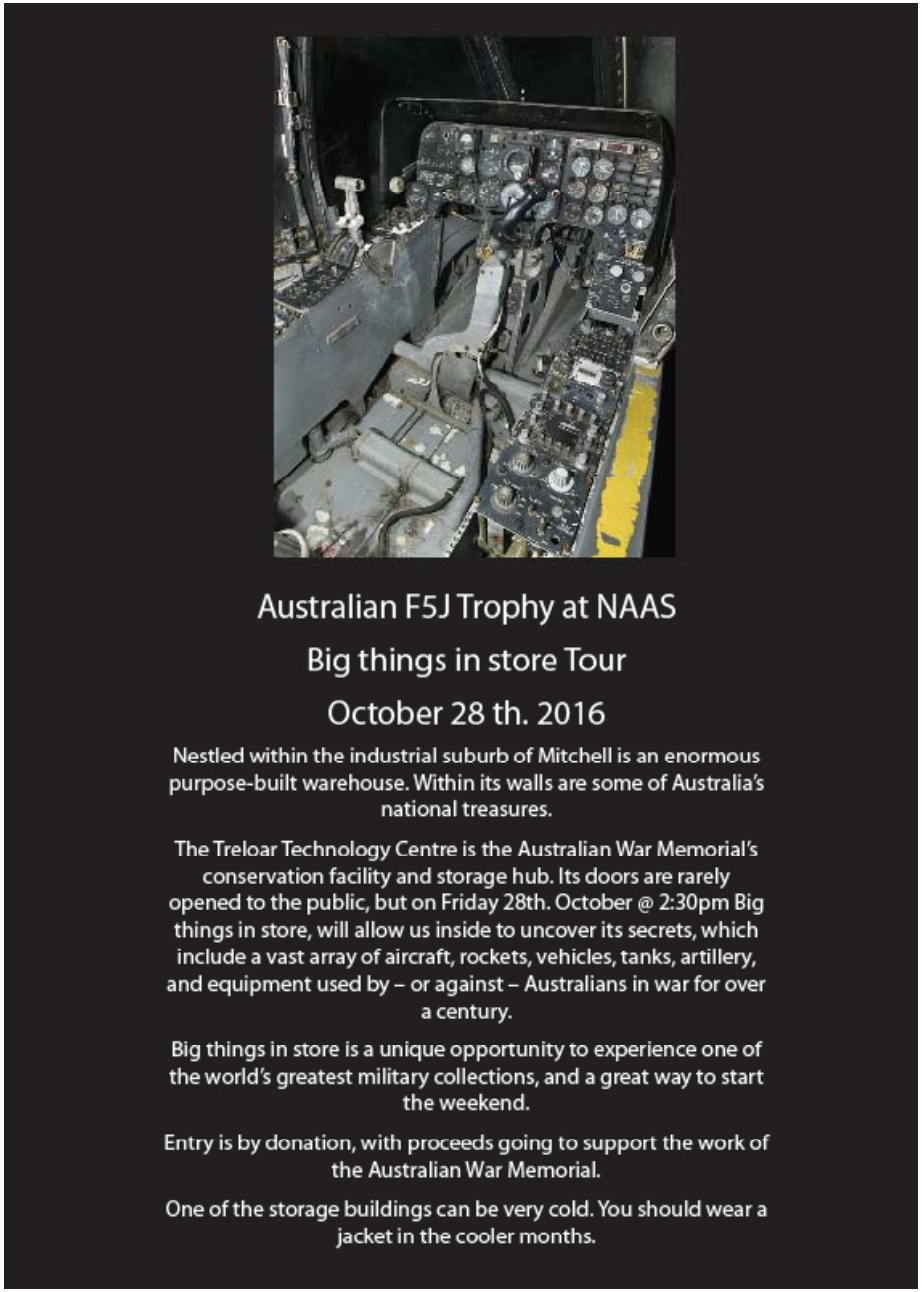
Scheduled for the NAAS field near Canberra on 29-10 October

Entries definitely close 22 October!

The draw will be finalised on 23 October and printed out for all to have a copy!
You will not be able to fly if you have not entered - unless someone does not turn up and you fly under a different name!

See the AEFA web site for an entry form.

Please fill in the entry form and submit it, even if you are only visiting the War Memorial Storage Unit, or partaking in the Spit Roast. We need numbers.



Are you coming to the F5J Trophy event at NAAS?

Avail your self of a private tour of:

Australian War Memorial Storage Facility

See aircraft and equipment never before displayed
Friday afternoon 28 October at 3:00pm
Entry by donation - bring warm clothes - see flier (left)

AUSTRALIAN WAR MEMORIAL

NAAS / National Electric Flyer's tour of the Australian War Memorial Treloar Storage facility.

Friday 28 October, 2.30-4.00 pm

The facility is a large beige colour-bond building on the corner of Vicars and Callan Streets, Mitchell, ACT. Free street parking is available outside the building.

Conditions of entry:

The Annex is both a functioning workshop and storage facility. To ensure both the safety of the visitor and that of the objects we ask that you comply with the following conditions:

- One of the storage buildings can be very cold. Visitors are advised to wear a jacket or sweater in the cooler months. Please also be aware that the tours are conducted on hard surfaces where you may be standing for extended periods. Seating and toilet facilities are very limited.
- Visitors must not move about the facilities unescorted. If a visitor needs to leave the tour group, please advise a member of staff;

continued next page.....

Instructions for Australian War Memorial Storage facility tour continued .....

- Visitors should remain courteous to other members of the group and to the tour guide. Please stay within easy earshot of the tour guide and refrain from conversations whilst a tour guide is talking; and switch off your mobile phones.
- There are a number of sharp, dirty or fragile items on floor pallets, as well as a number of trip hazards. Visitors must therefore wear closed sensible, toe shoes. Visitors wearing thongs or sandals will not be permitted entry.
- Children under 16 must be accompanied at all time by guardians;
- Bags, overcoats, books etc may not be taken into the annex without the specific approval of the Curator in charge, and eating, drinking and smoking is forbidden within the facilities;
- Photography is welcomed, but please do not record film – many people find this highly intrusive and distracting.
- Visitors must not touch or place objects on any of the relics. Although the items were robustly designed for military conditions they are now museum pieces, preserved for the nation and must be treated appropriately. Touching deposits oily and acidic residues from the skin on historic surfaces, and can abrade the surface, cause corrosion, loss of paint, or deposition of soil;
- Please arrive for the scheduled time. It inconveniences other visitors if a tour is held up waiting for late arrivals.

Support our sponsors!

Model dealers and private enthusiasts have agreed to provide prizes to give away to contestants at the F5J Trophy event. Everyone will have a pick from the collection of donated items. These people support our sport, so we ask you to support their businesses and buy from them:

Dave's Toys for Big Boys	www.hyperionaustralia.com.au	Phone: (03) 9887 0558	Mobile: (0415) 412 096	Melbourne based
Model Flight Adelaide	www.modelflight.com.au	Phone: (08) 8186 4250		Adelaide based
Monaro Hobbies	www.coltaylormodels.com.au	Phone: (02) 6239 3623		Canberra based
Christian Traders	www.christiantraders.com.au	Phone: 1300 733 673		Taree based
Electric Flight in Australia	www.flyelectric.com	Phone: (02) 6676 1437	Mobile: (0407) 732 440	Pottsville based
Albury RC Models	www.alburyrcmodels.com.au	Phone: (02) 6025 0497		Albury based
XC-RC	www.xc-rc.com.au		Mobile: (0434) 026 592	Melbourne based
Sky Soaring Robots	www.skyrob.com		Mobile: (0410) 794 173	Newcastle based
Alan Mayhew	www.varms.org.au		Mobile: (0412) 994 213	Melbourne based
Stan Rucinski	www.naas.org.au		Mobile: (0409) 917 506	Canberra based

Look at the great list of prizes at the F5J Trophy Event in Canberra - everyone receives a prize!

Prizes at the F5J Trophy Event
NAAS field, Canberra – 29/30 October 2016

AEFA Members – please support these suppliers who are supporting us!

All competitors will be able to pick items from the assembled donations
Check the list and see what you can pick up by flying in this event:

Dave's Toys for Big Boys, Melbourne
Dave Pratley, 7 Castlefield Square, Wantirna VIC 3152
Phone: (03) 9887 0558
www.HyperionAustralia.com.au

- Hyperion Duo Charger – 1st Prize Open F5J
- Associated electric flight products

Model Flight, Adelaide
Mike O'Reilly, 130 Goodwood Rd, Goodwood SA 5034
Phone: (08) 8186 4250
www.modelflight.com.au

- Spektrum DX8 Radio Set – 1st Prize Limited F5J
- 2 x Dualsky 2200-3S Eco 25C LiPo packs
- 2 x Dulasky LiPoMate 6-cell Voltmeter and Balancer
- 2 x Spektrum A320 Digital Micro servos

Monaro Models & Hobbies, Canberra
Terry Griffiths, Monaro Models & Hobbies, 80 Newcastle Street, Fyshwick ACT 2609
Phone: (02) 6239 3623
www.coltaylormodels.com.au

- Great Planes Siren Hotliner ARF kit

Christian Traders, Taree
20190 Pacific Hwy, Johns River, NSW, 2443
Phone: 1300 733 673
www.christiantraders.com.au

- 2 x Aerokote Gloss 100ml bottle
- 2 x Foam Blaster
- 1 x Roket Blaster Top Up 250ml
- 2 x Roket Tube Blue – 100mm x17mm bore
- 1 x Model Lite 240cc Tub
- 1 x Model Lite Balsa Tint – 240cc tub
- 1 x Australian National Flag Stickers – 5 x 50mm pack

Please note – some of these items may be combined.

flyelectric.com, Pottsville
Peter Pine, PO Box 324, Pottsville NSW 2489
Phone: (0407) 732 440
www.flyelectric.com

- 1 x MVVS 3.5/1400 Sport motor (suitable for large F5J glider)
- 1 set/ Aero-naut 40/5mm precision spinner, 42mm centerpiece, 15x10" blades (sizes can be exchanged)

Albury RC Models & Hobbies
Rob Sargent, Shop 3\329 Urana Rd, Lavington NSW, 2641
Phone: (02) 6025 0497
www.alburyrcmodels.com.au

- 5 x $50 Shopping vouchers – buy what you need! Recover your entry fee!

continued next page

Prizes to be given away at the F5J Trophy event continued - please support these suppliers as they are upporting us!

XC-RC, Melbourne
Xerxes Cooper, 61 Katrina St, Blackburn North VIC 3130
Phone: (0434) 026 592
www.xc-rc.com.au

- 1 x Prolux Battery Checker
- 1 x Prolux Digital Tachometer

Sky Soaring Robots, Newcastle
Ladislav Safarik, 106 Brighton Avenue, Toronto NSW 2283
Phone: (0410) 794 173
www.skyrob.com

- 1 x Propeller Aeronaut Cam Carbon 10x6
- 2 x Propeller Aeronaut Cam Carbon 10x7
- 1 x Propeller Aeronaut Cam Carbon 12.5x9
- 1 x Propeller Aeronaut Cam Carbon 14x6
- 1 x Propeller Aeronaut Cam Carbon 18x7

Stan Rucinski, NAAS Canberra
Phone: (0409) 917 806 for enquiries about NAAS
- 1 x Hyperion Battery Sentry V.3
- 1 x E-Flite Power Meter
- 1 x Vitaprop 16x8" moulded carbon blades
- 1 x Hyperion G6 HV 900-3S LiPo pack
- 1 x Dave's Toys HV 1000-3S LiPo pack

Alan Mayhew, Melbourne
Phone: (0412) 994 213 for Prego kits and enquiries about VARMS
- 1 x Prego 3.6m electric glider short kit

John Webster, Lake George Club, Canberra
- Watts Up 2.5m Electric Glider kit

Note - Sailplane Expo over 4 days in 2017!

The popular Sailplane Expo has reached its 37th year, and a new pattern is being applied this year. As Australia Day falls on a Thursday, F5J will be run on its own from Thursday morning until Friday lunch time. Then Open Thermal winch launch glider will be run from Friday lunch time to Sunday lunch time. F3K Hand Launch glider will be held at lunch time over all days.

You can have 1.5 days of pure F5J!

You can have 2 days of Open Thermal winch launch!

You can have 4 days of flying if you enter both events!

You can fly Discus Launch glider each lunch time.

Entry forms now available on:

AEFA web site - http://www.aefanet.com/37th-armidale-sailplane-expo
LSF Web Site - http://www.lsfaustralia.org.au
Hutton Oddy's Fly-RC site - http://www.fly-rc.com.au/?page_id=110
Peter Pine's web site - http://www.flyelectric.com/Expo-main.html

Please note:

F5J will be held as a stand alone event from 10:00 on Thursday January 26 until 13:00 on Friday January 27.

Open Thermal will be held as a stand alone event from 13:30 Friday January 27 until 14:00 Sunday January 29.

F3K will be held from 1230 - 1300 each day.
The field will be available for practice Wednesday January 25, 2017
Contact - Hutton Oddy: vhoddy@gmail.com or 0425 285 758

Electric Glider & EOT Postal Competitions each month

There are electric glider and EOT postal events each month. Gary Andrews manages monthly results for Radian glider and F5J. Mike Colston manages the EOT tasks (see e-mails below). You can practice these events at your own field in your own time, and e-mail the results to Gary & Mike. Each month they tabulate the results and send them back to you. It is a great way to practice flying these events; you go out flying with a purpose instead of just hacking around the sky! You can even time yourself, and you can repeat the tasks as many times as you want and send in a good score when you get one. The rules can be found on the AEFA web site (active link below) - look them up and join in the fun!

Electric & Glider FLIGHT Australia magazine - produced under the auspices of the Australian Electric Flight Association - contacts:

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Coordinator EOT Focus Group	Mike Colston	NSW	mncolston@hotmail.com

(links and e-mails are interactive in this document - to send an e-mail from this page, click on the e-mail address)

Web site - www.aefanet.com