ABERDEEN AND DISTRICT SOARERS

Newsletter No.44

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Whitlam Farmhouse
Newmachar
Aberdeen

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Comming Events

Date	*Place*	*Event*
June 8/9	Hazlehead	North East Glide-In
Jun 16	Montrose	Fly-In
Jun 23	Glencraig	Open - 100S - Electric
Aug 3/4	Pitrevie	Scottish Soaring Nationals
Jul 6/7	Hazlehead	Bon Accord Fly-In
Aug TBA	Stead Inn, Potterton	Family Barbecue
Sep 14/15	Loch Inch	Water-Plane Fly-In
Sep TBA	Huntly	Taylor Trophy
Oct TBA	TBA	Dinner Dance
Nov TBA	TBA	AGM
Sep 8	Seaton	International Postal Challenge

Don't forget the Glide-In this week end at Hazlehead - see page 3 for details

Editors Comment

Apologies for yet another long absence of the newsletter - just too many commitments in the last few months. Well hopefully this will appear on your door step in time to enthuse you into participating in the Hazlehead Fly-In - More on that later.

A bumper issue this time with hopefully something for everyone, From Andy's report on the Vega (sadly no longer, he put it in on Durris following a wing fold at great height a couple of weeks ago), to a novel vectored thrust *Aeropter* (I know it's not a glider, but interesting anyway). And "not another boring article on safety" - I'm afraid so, but very necessary that we don't disregard this essential aspect of our hobby.

I've just returned from Radioglide, Rather a disastrous event for me I'm afraid. I just received my confirmation of entry 10 days before the event, (I wish we could get more warning, especially for those willing to travel some distance). The trouble started with the frequency I had requested being unavailable (80), and 84 substituted. (Not unreasonable in view of the number of entrants).After spending a day on the phone is search of 84 crystals for my Merlin radio, which uses Multiplex crystals, I was to discover that Multiplex only make channels 61 - 80, as the UK is the only user of channels 81 to 84. That evening the CD was contacted and my difficulties explained. I was assured not to worry, someone else with more conventional gear would be moved, so that I could fly on 80, or a lower channel, and compatible crystals would be found.,. The evening before the Open at Oxford, I was given some 84 Skyleader crystals, and assured by the CD that the were Multiplex compatible.

After a quick short-range check on the ground, all appeared, to be in order, however soon after starting to circle at line tow-line hight, control was lost, and I was forced to watch my newly completed 4M Algebra variant with flaps and aerolons, drift off down-wind in fail-safe model After searching the miles of Rover factories in the general direction of last seen, I was just beginning to giving up hope of ever seeing my model again, when an ambulance delivered the remains to the flying field. It had come down on a busy duel carriageway about 1.5 miles away, with miraculously no damage or injury to third parties.

With a zero score for the first round, that finished off my chances in the open, although a position on 80 was subsequently made available so I flew the remaining 3 rounds reasonably successfully with the battered old 2.5 metre aerolon model.

A close examination of the Tx crystal confirmed the problem, Multiplex (and Powermax Merlin) use half frequency crystals in the transmitter, ie 17.5MHz with a frequency doubler circuit for an output frequency of 35.0MHz. The Skyleader crystal was 35.0MHz. Moral, don't accept strange crystals from CD's!

As only 84 was available to me for the, electric, I declined to fly. Ironically, the only event that I was not taking too seriously, the 100S was more successful. Not having a proper 100S model finished in time, I converted my Flinger to 35MHz (27MHz not allowed in 100S), by adding a second receiver because the old receiver was permanently fitted, and 27MHz was still required for handlaunch. The only available space for the additional; receiver was well down the fuselage, requiring considerable lead in the nose of the poor old Flinger. I expected to come last with the now vastly overweight and undersize model, however it enabled me to fly and have some fun. I ended up 64st out of an entry of 120, flying one slot to 7min 40sec. It's amazing how small the Flinger gets after about 6 minutes in strong lift!

Anyway, don't let the above put you off competing at Hazlehead, ADS comps are far better organised and accommodating. (Right Brian?)

Finally the latest membership list is on the back page. Welcome to ADS new members, Finle Evans and Leslie Dempster, and welcome back Neil Logan, a founder member of ADS who has recently returned to model soaring after many years. If your not on the list, and intend to continue your membership - please pay-up quick!

Richard Holt

Chairman's Report

Here we are in May, and suddenly it's back to the Summer routine. Saturdays and Tuesdays are spent heaving planes off slopes and pulling them up on the line at Seaton. We have had some very good slope days already this season and, I'm glad to say, a (little) bit further away than Brimmond. We have been alternating between Cairn O'Mount in South Easterly conditions, and Durris in North Westerlies. Actually, Durris does not take all that much further to travel to, and is a very easy walk when there. There is talk of Hill of Fare being a possibility in the next Southerly or South Westerly.

Seaton has now seen several Tuesday evenings albeit rather cold and windy ones. The nights are getting longer, so how about it? Every one is welcome, flying starts 6.30 to 6.45 pm. Hope to see you down there, either at the high rise flats end, in Northerly conditions, or the North Beach Boulevard in Southerly conditions.

This is the year of the high tech computer radios. Having just bought one, a Futaba Super 7, I can say that it is fantastic for initial setting-up (throws, dual rates, mixing etc). Isn't it interesting that two new owners of these radios have pranged their planes terminally. (Actually, Andy's crash wasn't due to the radio - more likely, structural fatigue). My crash was, in retrospect, pure over-experimentation (is that a word?) with the radio. Whilst the computer radio can make the surface do anything, the human brain must judge whether the movements are ordered correctly. In my case, drooping outboard ailerons "to assist lift" on take-off - coupled aileron, used as flaps, with elevator input - too much tension on the line - too much up-elevator - tip stall due to wash-in effect - semi circle into ground - end of a lovely flier.

If I had inboard flaps on the plane, it would have been in order to programme some droop on them - but not on aileron. We live and learn ... in retrospect. Notwithstanding, the computer sets can make for most versatile flying, when properly programmed!

Elsewhere there is an announcement about our forthcoming fly-in on June 8-9. This is our one big event of the year, and we hope that everyone will make a big effort to be there.

I've no room for any more just now - hope to see you on the field.

Jim Anderson

Hazlehead Park Glider Soar-In

8/9 June

Saturday 8th June	Fly for fun day
10:00am Start	Gliders
	Electric Powered Models
	Scale
	Aerotows

Brian Sharp hopes to be in Aberdeen for this event and is willing to carry out SAA soaring certificates on the Saturday if there is enough interest.

Sunday 9th June	Open % Slot Competition
11:00am Start	Electro Slot Competition
All beginners welcome	BARCS Rules

For further Details, contact Andy Thoirs, Tel. 0224 712008

Safety at our Sites

I think now ,before the start of the new season , is the time to think about safe flying at our sites around Aberdeen. As usual(!) not only should we should be following all the safety guidelines provided by the S.A.A. but also following local rules which are relevant to that site. Rules for these sites are listed below.

Brimmond Hill

As far as possible all members must keep to the recognised footpaths

Aircraft launch point must not be less than one hundred meters from the radio towers.

Seaton

Southerly Winds

Members vehicles must be parked along esplanade.

Aircraft launch point must be not less than fifty meters from road

No low flying over roads, golf course, or houses.

No flying over high rise flats.

Northerly Winds

Members vehicles must be parked in high rise flats car park (off King Street).

All other rules as per southerly winds.

Andy Thoirs

Pat Teakle Quarter Scale Vega

A few months ago I gave Richard a copy of the Pat Teakle range of scale sailplanes price list to put in our newsletter. Subsequent to that I have received many queries,so I thought I would write a few words on the subject.

If you contact Pat by phone you will find as I have , that he is only too willing to provide information and help. Although he does not accept credit cards his turn-around is quick. Delivery as he says in his price list is by ANC - be prepared to move your car out of your garage! The box is usually around ten feet long depending on the model and on opening you will find your eyes drawn immediatly to the large polyester glass fibre fuselage which only requires the minimum of finishing. Usually also supplied, depending on the model, are a foam rudder and tailplane. If you now inspect the wings (the Vega is supplied as two 70" panels!) You will find that Ramin spars are already in- layed along with bowden cables for the ailerons and spoilers. In the box also are hardwood leading edge for the wings and a canopy.

Although numerically the parts supplied are small, further parts required to complete the model would only amount to a few bits of balsa and ply.

The information supplied with the kit is of a basic nature but, for the experienced modeler, everything is so straight forward that it is quite simple to assemble.

I built my Vega about two years ago while I was still living in a flat- the only way I could assemble it was to have the fuselage in the Hall, the right wing in the kitchen and the left wing in a bedroom(it was a small flat!).

Rather than use the usual top wing spoilers I opted to use the trailing edge airbrakes as used on the fullsize. Other mods included a proper cockpit, pilot, mainwheel, tailwheel

and scale markings of a fullsize Vega based at Aboyne. All up weight is around 9 pounds.

Flying The Beast (The Fun Bit)

Flying the Vega to start with was anything but fun. A lot of Rudder/aileron co-ordination is required to keep everything under control. These models should not be slowed up or disaster! (otherwise known as wing drop,followed by incipient spin,followed by splat)

Having a sleek shape this plane will use up a lot of sky , its no use just pointing it into the wind and rubbing your hands together- keep your fingers on the sticks and fly the thing.

Recently I have carried out a few mods ,such as fitting a servo into the tailplane for elevator control, and am finally getting the hang of flying. Where the model comes into its own is on gusty days when the wind is above 15 knots and all the other models are bouncing around or disappearing over the back of the hill. These large models have the penetration and the wing loading to cut through the crap and get into the good lift further out, sailing serenely about, abet with the wings flapping a bit-just like fullsize.

Andy Thoirs

Notes for the Guidance of Pilots and Examiners.

Thermal and Slope Soaring.

These tests are primarily aimed at promoting safe flying practices. The tasks in these tests may well be flown perfectly but if they are not flown in a safe manner, the test will be failed. Examiners will be watching to ensure that the pilot goes through his preflight checks before every flight.

As with the tests for powered aircraft, pilots will benefit from practising the requirements before asking to be examined. The landing, especially where a landing into a small circle is required, is one section where practice is very beneficial.

The Bronze tests are not difficult and should be within the capability of fairly recently soloed pilots.

The Silver tests are considerably more difficult and require a higher level of proficiency. It requires the pilot to be able to manage their height and time, and to be able to fly and position their aircraft accurately.

The Gold tests are more difficult than the Silver. These tests require a high degree of smoothness of flying from the pilot plus an increased level of accuracy.

Thermal Soaring (Flat Field)

3.1 Bronze Test.

(a) The launch, whether by power winch, bungee or hand tow should be kept fairly straight. Slight veering on the tow line is acceptable provided that it is corrected promptly and accurately. A stall when coming off the line at the top of the launch should be avoided, but may still occur when using a bungee in stronger winds. Any stalls from this position should also be dealt with promptly. As this is a safety test and not a competition there is no requirement for "ping" style launches which may lead to unnecessary stalling problems for the less experienced pilot.

(b) The left and right hand circuits should be performed upwind of the launch point and to the left and right of the wind. These may take the shape of square or racecourse circuits or large circles. However, whichever shape is chosen, both circuits must be of

the same shape and of approximately the same size. Care should be taken not to overfly pits, spectators, etc. whilst performing these circuits. Please note that a 30 ft diam circle does not constitute a circuit, no matter how well it is performed.

(c) For the landing, the pilot should be positioned either on the upwind edge, or to one side of the landing area. The landing approach should be commenced with the downwind leg of a circuit, flown well to one side of the launch points and avoiding the pits, spectators, etc. The turn in to the base leg of the circuit should be approximately 20m - 50m down wind of the centre of the landing area, depending on the wind strength and available height.

If the aircraft sti11 has excessive height when in position downwind of the landing circle it is in order to burn off some of this height. A safe method of losing this excess height is to perform a zig zag pattern across the width of the field whilst approaching no closer to the landing area. Airbrakes may also be used to reduce height if fitted. It is inadvisable to turn away from the landing circle at low altitudes.

For the final approach the airspeed should be increased to improve control response and the landing made straight into wind using airbrakes as necessary. If the aircraft is slewed round on touch down due to a wing catching a tuft of grass, etc, this will be acceptable provided that the rest of the approach and landing is good.

3.2 Silver Test

(a) The launch should be good and straight with no deviation from line. The transition from towed to gliding flight should be smooth. If a "ping" launch is attempted there should be no stall and the direction should remain constant.

(b) The 4 min duration flight should be timed from the moment of release from the line to the moment of touchdown. A helper should be employed to keep the pilot informed of the passage of time. In light wind conditions the 4 min duration may be possible without having to seek lift. In windier conditions lift may be required to fly out the period and this should be considered before attempting the test.

There is no set flight pattern required during this test, however examiners will be watching for a proper approach and landing similar to that of the Bronze test.

The approach and landing in the circle should be smooth and controlled. Excessive height should be properly controlled by a safe, height reduction flight pattern or the use of airbrakes. Should the approach be too fast and the aircraft is slammed into the landing area. the flight will be failed.

Do not be hurried, there is a 20 sec window in which to land the aircraft in the circle.

3.3 Gold Test.

(a) All launches should be kept good and straight. similar to the silver test. As soon as the aircraft has left the line at the top of a 150m launch an emergency landing should be declared and the aircraft brought down to a safe landing in a maximum of 60 seconds. The decent should be performed in a safe manner and in a safe location. Care should be taken during this test that the method employed to loose height does not over stress the airframe. The landing should be performed in a safe position and also into wind.

(b) The duration task is similar to that of the Silver test but soaring flight is likely to be needed to achieve the 6 min time requirement. Once again a helper should be used to keep the pilot informed of the passage of time. There is no set flight pattern required during this test, however examiners will be watching for a proper approach and landing similar to that of the bronze test. The landing approach should be good and straight (remember, the landing area is much smaller).

(c) The spin should be entered from a straight stall into wind and should be terminated after 1 full turn. A slight deviation from heading on the recovery can be accepted. This manoeuvre should be performed at a safe height but not at such an altitude that observation by the examiner is difficult. It should be performed to one side of the launch point, away from pits, launch points, etc.

Parts (b) & (c) of this test may be flown as one flight so long as 5m diam circle is used for landing.

(d) The low pass should be performed to one side of the field, away from pits, launch points, etc. The twenty foot level has to be judged by eye and experience and should be agreed with the examiner beforehand, perhaps using a landmark on the horizon for reference. The low pass should be approached from a shallow dive. The dive should not be started from too high or made too steep, as this could put excessive stress on the structure of lighter gliders.

The round out and climb following the low pass should be made as smooth as possible. The 1 min time period will be judged from the moment of exiting the low pass to the moment of touchdown.

There is no set flight pattern required during this test, however examiners will be watching for safe flying.

Slope Soaring.

3.4 Bronze test.

This test should be performed with the pilot standing fairly central on the slope, with the manoeuvres laid out to each side.

(a) The figure of eight pattern does not require to be performed as large round circles similar to the power test . This would be impractical on some slopes and in many wind conditions. An elongated eight is perfectly acceptable so long as both legs of the eight are more or less equal. The aircraft should not gain height during the figures of eight, but remain between ridge height and 5m above the slope.

(b) The centre of the landing area should have been marked prior to the start of the flight. The approach and landing may be flown either as a square or a racecourse circuit. For the landing, the pilot should be positioned either on the upwind edge, or to one side of the landing area. The landing should be commenced with the downwind leg of the circuit well to one side of the pilots stance. The turn in to the base leg of the circuit should be approximately 5m-25m down wind of the centre of the landing area, depending on the wind strength and available height.

If the aircraft still has excessive height when in position downwind of the landing circle it is in order to burn off some of this height. A safe method of losing this excess height is to perform a zig zag pattern across the rear of the hill whilst approaching no closer to the landing area. Airbrakes may also be used to reduce height if fitted. It is inadvisable to turn away from the landing circle at low altitudes. For the final approach the airspeed should be increased to improve control response and the landing made straight into wind using airbrakes as necessary.

3.5 Silver Test.

(a) The figure eight should be performed in a similar manner to the Bronze test.

(b) The inside loop should be performed crosswind and in front of the pilot stance. The loop should be quite large and round but without any hint of stalling or screwing out at the inverted position. It should also be performed far enough out from the hill to prevent it drifting back over the slope.

(c) The outside loop should also be performed crosswind and in front of the pilot stance. It should be started from the upright position and performed in a downwards direction. The loop should be quite large and round . There should be no hint of stalling or screwing out as the aircraft returns to upright flight at the completion of the manoeuvre. It should be performed far enough out from the hill to prevent it drifting back over the slope.

(d) The stall turn should be performed at one end of a pass along the face of the slope . The aircraft should be pulled up to the vertical, and should continue in the vertical for some distance. The aircraft should stall at the top of the climb and turn outwards, away from the slope. The downwards track should be within one wingspan of the

upwards track. The pull out should be at the same level as the approach. The aircraft may be yawed sideways on the upward leg to assist the turn.

(e) The rolls should be performed into wind directly in front of the pilot stance. They may be either barrel or axial rolls, so long as the examiner is informed before they are performed. The direction and height of the rolls should be constant. They may be performed in either direction but they must be done as one continuous rolling manoeuvre.

(f) The inverted pass may be commenced from either a roll or half loop. The flight path should be along the face of the slope, in front of the pilot stance. The wings should be kept level and the height constant.

(g) The landing procedure should be similar to that of the Bronze test. The approach and landing in the circle should be smooth and controlled. Excessive height should be properly controlled by a safe, height reduction flight pattern or the use of airbrakes. Should the approach be too fast and the aircraft is slammed into the landing area, the flight will be failed.

3.6 Gold Test.

(a) The loops should be performed crosswind and in front of the pilot stance. They should be quite large and round with the second loop superimposed on the first. There should be no hint of stalling or screwing out at the inverted position. They should also be performed far enough out from the hill to prevent the aircraft drifting back over the slope.

(b) The stall turns should be performed in a similar manner to the Silver test but performed one after the other at opposite ends of the slope. The turns should always be made in a direction away from the slope.

(c) & (d) The three consecutive rolls should be performed crosswind along the slope, in front of the pilot stance. They may be either barrel or axial rolls, so long as the examiner is informed before they are performed. The direction and height of the rolls should be constant. All three rolls must be performed as one continuous rolling manoeuvre.

(e) The spin should be performed in front of the pilot stance. It should be entered from a straight stall into wind and should be terminated after 3 full turns. Slight deviation from heading on the recovery can be accepted. It should also be performed far enough out from the hill to prevent the manoeuvre from drifting back over the slope.

(f) The approach and landing should be performed in a similar manner to the Silver test.

In the Gold test it is possible to link some of the manoeuvres together so that they are flow as a continuous pattern. Where the hill and wind conditions allow the manoeuvres should be linked. However, in some conditions it is not possibie to do this and examiners should take this into account when testing.

Thermal Competitions

Copied, with thanks from the Soarer, an article by Graham Moss

Overheard during the last thermal competition at the park - Question - "Why do they all wait so long to launch after the hooter goes?" Answer - "It's tactics. I don't know what the tactics are but it's tactics.

This article is an attempt to help the average, power-crazed, methanol sniffing club member to understand a bit more of what is going on at future comps.

The competition is pre-arranged into three 'rounds' during which each competitor flies once and 'slots' within each round, a slot being a number of competitors (between 4 and 9) flying against each other. After the three rounds of normal competition the nine

competitors with the highest total three round round scores then fly twice more to decide the final placings (the Fly-off). The three rounds of the main competition are arranged so that a competitor does not fly against any other competitor more than once (complicated isn't it?) This means that all competitors must be in a position to fly each time their name is called - if anyone misses their slot they are out of the comp. None of this 'Vintage' "fly when you like chaps!"

A pilot is allowed three helpers(?) - a towman using a maximum 150 metre hand towline, a timekeeper and a 'talker' whose job it is to tell the pilot any relevant information during the flight. eg. "The towman has just tripped over" or "your wings have come off", etc.

So let us assume we are at the flight line - The pilot, tranny in hand, spearing model and helpers alike with the aerial and in a general state of advanced panic - towman, 150 metres away (hopefully upwind); psyching out the other towmen with his new running shoes, timekeeper, alert and watchful, trying to work out how to zero the two stopwatches - talker, searching for his spectacles and offering helpful observations such as "I haven't a clue where the landing circle is."

A disembodied voice drifts out of the loudspeaker "the slot will start on the tone" followed a few seconds after by an unnerving Klaxon. At this point it is well to identify the method of scoring. The slot lasts exactly ten minutes and provided the pilot launches the model and lands it, before the end of the slot, in a rectangle extending 150 metres in each direction from the marked landing circles, he will get a points score equal to the number of seconds of flight time. Because the flight time doesn't start until the model leaves the towline this limits the maximum flight time to about 9.5 minutes but the minimum can be as little as a few seconds.

If on landing, all of the model comes to rest within 12.5 metres of the marked landing point ie. the landing 'circle', an extra 50 points are scored, irrespective of the flight time. If only part of the model is in the circle 25 points are scored. If the model is still in the air at the end of the slot time a 30 point penalty is incurred and no landing bonus can be claimed. The flight time stops at the end of the slot. If the plane has not landed 60 secs. after the end of the slot or the landing is outside the 'field' no points are scored at all. Simple really! Now comes the complicated bit. The actual score was, compared with the winner's. eg. if his score is half of the winner's he will get 500 points. Clear enough? Good, let's get back to the action at the flight line. Wait a minute - what action? The slot has started but what do we observe? - Pilot 1 is on his back taking a nap, nos. 2 and 3 are swopping jokes, no. 4 is at least gazing into the sky but showing no inclination to launch, no. 5 is arguing with his timekeeper (probably about how to start the watches!) and no. 6 appears to be fitting the wings on his model.

Time passes peacefully ..We will leave them there while considering the process of launching. The pilot signals his towman to start usually by waving one leg (waving both legs is not recommended). Alternative signals are waving model, transmitter or screaming. It is vital that the pilot and towman have agreed on the signal to be used as a misunderstanding leads at best to embarrassment and at worst to grevious bodily harm. Assuming we can encourage our towman to move at all the towing speed is dependant on the wind speed, the following usually applying -

High wind - Towman runs nervously away, stops when shoulder dislocates and ends up running or being dragged towards flightline.

Moderate breeze - Steady trot by towman, appreciative sounds from pilot.

No wind at all - Invariably provokes cries of "RUN YOU B*+*+*d" from the pilot and results in towman well knackered (a technical term).

Back to the flight line just in time to spot no. 4 secretively moving his right leg and then wildly waving all limbs and equipment when he realises that his towman has gone to sleep/gone home/etc. He's off! The model climbs steadily up the line. Instantly, like five statues of a classical javelin thrower the other pilots are tensed, eyes are glued to the ascending model as it detached itself from the towline. A second or two to check that it is not heading earthwards at a rate of knots and the rest are off, like a pack of greyhounds after the lone hare (Exciting isn't it?)

Why? Why was no-one interested in launching when the slot started? Why did one brave soul break the ice? Why didn't the others launch at the same time? Why did they all launch together? Why did I start writing this drivel? The answers to these and many other such questions will soon become clear. First we must think back to the method of scoring. The maximum score over the three rounds of normal competition is 3000 points but even achieving this is no guarantee of winning the competition because the top nine pilots go through to the fly-off which determines the final placings. So - the first objectives is not necessarily to win a slot but to get enough points in each slot to get in the fly-off. (An average of 900+ is often sufficient).

ERGO - to be first to launch and last to land is not too important but to be close behind the guy who does is vital. The strategy is clear - do not launch until:

a) Some other idiot loses nerve or

b) you are confident that you can fly the time remaining in the slot. Being serious for a moment an experienced glider flyer may well be confident of flying the whole slot if there are genuine signs of thermal activity e.g. birds circling. Fortunately, for spectators, etc., there are usually enough idiots or over-confident pilots to ensure that the average slot lasts more than three minutes of actual flying even if conditions are distinctly unpromising. O.K., back to the flight line -

Most of our heroes are aloft but to enable us to consider a couple more rules let us assume that one of the towman thinks he's Daley Thompson and has enthusiastically torn the wings off his pilot's model whereupon one of the other towmen was distracted using the same or a reserve model provided that the first flight is not more than 60 secs. (It is irrelevant where it lands). Both pilots in our story could therefore re-launch and stay in the hunt. One rather sneaky rule disqualifies a flight if any part of the model detaches itself during the flight. Interestingly, this does not apply to landings however spectacular and a full landing bonus is even applied if all the debris is inside the landing circle!

The two re-launch competitors are away, one with spare model and severe heartstrain but at last we have six planes in the air. Now we all know what happens when flying, don/t we? - We know exactly where the model is but unfortunately other things have a nasty habit of moving. eg. trees, the ground, points of the compass, etc. In addition, World War three could start without us noticing! The talker now comes into his own, providing a constant stream of valuable information to ensure his pilot has the best possible chance. You don't believe it? - You're right!

only has to control his model, he has to filter out the occasional titbit of useful information - "There's an ostrich thermalling to your left" - from a steady stream of rubbish, usually capped by "Which model is yours?" Mind you, that question can be a good one as it is by no means rare for a pilot to diligently try to control a seemingly wayward model only to find out that it isn't his!

Eight minutes into the slot a second klaxon/horn/burp emits from the loudspeaker. Two minutes to go - relief for those trying to scratch lift in the warm air above an innocent courting couple - panic for those that have forgotten there's a comp. on in the excitement of working a "boomer" to two thousand feet. Both are of potential joy to the spectator, the former continuing to scratch lower and lower until trapped into a downwind landing ("HEADS", if not "KNEECAPS", being the cry!) The latter indulge in a variety of hair raising maneouvres to lose height without breaking the World speed record, the model, or both. An interesting note for power fliers is that when you hear the reminiscent sound of an unsilenced four-stroke it is actually high speed tailplane flutter, often followed shortly afterwards by high speed tail plane disintegration. Note - any sort of resaonable landing with one or both tailplane halves missing rates a small round of applause.

Assuming that some planes are still in the air as the end of the slot approaches let us consider the position of the pilots, now in the throes of a mental breakdown as they stumble towards the landing circles. Landing early will only cost them the points equal to the number of seconds left in the slot. Landing late will cost them a 30 point penalty and no landing bonus. The tactics are obvious - land early and make sure of those 50

landing points. What do we actually see? Everyone grimly determined to land at the last possible second (it's called pride - pronounced 'T H I C K').

The final horn sounds, the slot is over, timekeepers bring in tow watches bearing no relation to one another, talkers are enthusiastically reminding the pilot of all his errrors and the pilot himself is in another world entirely, either grinning idiotically or grinding his teeth depending on the result. The competitors for the next slot are already making their pilgrimage to the flight line.

Three rounds, much computing and we have nine finalists for the fly-off. Two slots of 15 minutes each with the cumulative score over both slots deciding the places. Nine happy competitors, eight of whom are convinced they were unlucky.

One or two final points for advanced observers to watch out for: The pilot who screwed up in round one, launching as soon as the slot starts in rounds two and three, hoping to screw up the rest.

The inexperienced towman sprinting halfway to Castleford before realising that he's towing the remains of the model along the ground.

The pilot who thinks he may be close to the fly-off pretending not to be interested in the scoreboard.

The homicidal maniac who a few minutes before had been a happy slot winner, until his timekeeper announced that neither watch had started.

The towline through the wing of another competitor tactic - always guaranteed to win friends and influence people.

The slot crammed with high-tech monster models being flown into the ground by the newcomer with his balsa and tissue free-flight conversion.

That's thermal competition for you. Hopefully you will now come and enjoy (as an expert!) the ones next year. Why not come and complete? Just so long as you don't beat me.

News From T L Van Waart

The following letter was pased on from Graham Donaldson:

Dear Graham

Thanks for your Xmas card and the little story how things are moving along. As with you, also, Erik and Astrid are rapidly becoming rather indepent. Erik (taller than me) is in his 2nd year at Delft University (aer onautics!), and doing very well. Astrid (exactly my length) is the final run of secondary school now, going to University in August.

The ADS newsletter - even at its veriable frequency, is still interesting reading. From a distance the re-appearance of some cyclic problems is probably easier to see (The question on insurance seems to have the shortest cycle).

I would like to continue receive the Newsletter, to "cover expenses" I enclose a cheque which I trust you can pass on to the present Treasurer.

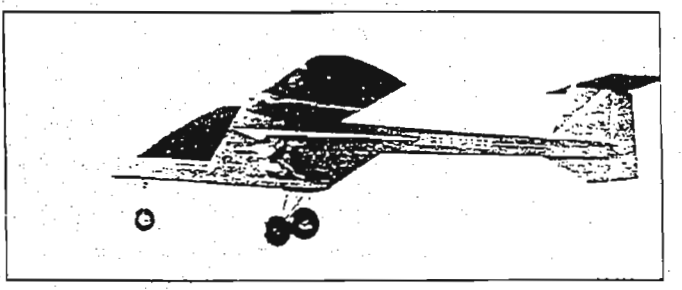
Although I see many names, some of the old hands are still (and actively) around. Give them our regards, and our best wishes to Steila and the "Kids".

Teun and Tinike

An Interesting Experiment in Model STAL

Copied, with thanks from the AEROSPACE journal

The Aeropter option



Why not vectored thrust for light aircraft? Wouldn't it do wonders for slow speed handling, field performance and safety? "There's only one way to find out," says JOHN CRAMPTON

This is a one-sixth scale radio controlled aircraft designed to maintain flight below normal stalling speed by rotating the thrust vector vertically and so augmenting wing lift with prop lift.

The name Aeropter was coined by my learned friend Hugh Scanlan, formerly the Editor of *Shell Aviation News*, who has taken a kindly interest in this project. He objected to Aerocopter, my first name for the machine, because the central consonant c was evidently a borrowing from helicopter, itself deriving from the Greek terminal Helix, *helikos* meaning a screw. The components Aero and opter, from the Greek *pteron* meaning a wing, are perfectly sound philologically, vouchsafed Mr Scanlan, adding that Aeropter would be classically correct for this rather unusual flying machine and the name would free it from the implication of rotating wings.

There it is then, Aeropter, an aeroplane which can vector the thrust of its engine(s) vertically and so augment wing lift with prop lift.

Augmenting wing lift with prop lift will result in reduced apparent wing loading and therefore stalling speed. Furthermore, takeoff and landing will be shortened.

The maximum static thrust of the OS Max-28F (4·5 cm³ two-stroke) powerplants in this prototype is 67% of takeoff weight. If this energy is installed in the vicinity of the centre of gravity and directed upwards, the benefits listed above must follow provided the aircraft can be controlled in this unusual configuration. There was only one way to find out.

Aeropter
Leading particulars

Wing span	6 ft 6 in
chord	11 in
dihedral	4 deg
Tailplane span	2 ft 3 in
chord	7 in
Length	4 ft 11 in
Height	1 ft 7 in
Engines	4·5 cm³
Propellers	9·75 in
Max static thrust	7 lb
Takeoff weight	10 lb 7 oz

Construction began in the spring of 1989 with the manufacture of the all important Thrust Vectoring Unit (TVU). This consists of a light 2mm plywood structure containing the Engine Bearing Tube (EBT), its PTFE bearings, the means of rotating it through 100° (from a horizontal thrust vector to 10° aft of the vertical), the fuel tanks and their plumbing to the engines, and the electrics to the throttle servos. The rotation of the EBT is proportionally controlled from the radio transmitter, as are all other services.

Once the TVU was made and thoroughly tested the remaining conventional airframe components were drawn, whittled up and bolted to it. The vital part of the assembly was to ensure, when looking at the side elevation of the aeroplane, that the centre of gravity (CG) was a mite forward of a line drawn between the centre of the EBT and the wing's centre of pressure (CP) — and *that* line to be vertical. One advantage of making the TVU as a complete unit is that a twin engine canard configuration might equally as well be bolted to it.

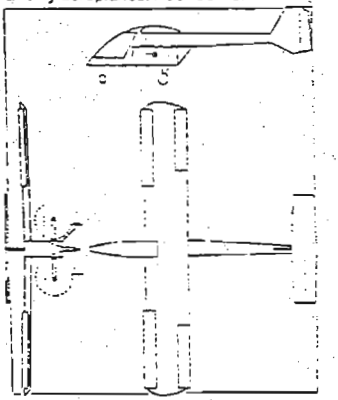
The features of the Aeropter's design are a T tail (out of the way of the propwash), high wing stability (ask any bird), generous (three-quarter span) fixed leading edge slats (to provide the slots to delay the stall), a long moment arm to the tail feathers (for good leverage), nosewheel steering, a one lb lump of lead hidden in the nose in lieu of a camera (which may replace the lead in due course) and a rate gyro — but not initially, read on.

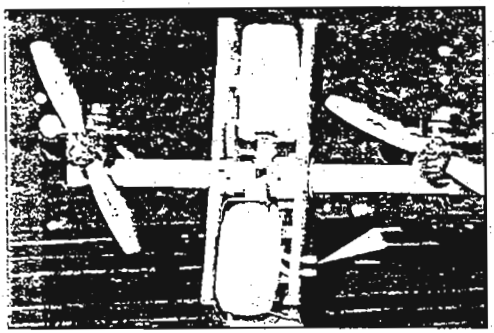
All was finished in the autumn of 1989 but then the bad weather set in and so, from time to time, I gazed at this aeroplane as it hung from the ceiling of my workshop. I exercised the controls and the thrust vectoring mechanism, trying hard to guess how it might fly. I got to know the aeroplane very well during this period. There is nothing better than pondering over a three dimensional working model of your own design. The computer's magic and the mathematician's "flute music" are all very well but, as Sir Sydney Camm once said, air is very cantankerous stuff. You must try and see the spray if you possibly can.

Clearly, the airflow induced into the face of the propellers as they rotated vertically was going to ruin the lift from the wing's centre section but as that happened the propellers themselves would start providing lift. There would be an art in flying this aeroplane and I longed to learn it.

Eventide, 21 May 1990. Secret airfield near Guildford. Gentle easterly breeze. All alone (essential for all maiden flights). Both engines on song throughout their r.p.m. range. Instant response to slam throttle movements. Nice straight taxi runs. Trimmed in roll, pitch and yaw. CG position checked and rechecked. All controls operating in the correct sense. By now I'd used up a quarter of the fuel load. Better go. Head into the breeze, open the throttles slowly . . . Astonishing acceleration and up and away before the throttles are fully open. Nice attitude. Climo straight ahead at less than full power.

The poetry of flight has been expressed by far better pens than mine and so I will simply say that I watched this small aeroplane with a sense of wonder. It had been flying around inside my head for more than a year and there it was, at last, sitting pretty in the sky. Life must be awfully dull for chaps who do not design, make and fly aeroplanes. Poor devils.





At thrust vector 90°, the servo driving the worm gear (which rotates the engine bearing tube) is partly hidden by the forward fuel tank. The axle of the 1:1 spur gear is the pivot of the feedback potentiometer, linked to the servo by a three wire umbilical. Right: *Brian Hoskins contemplates the prospect of never being late on the roundout again.*

Three hundred feet. Throttle back, level out, trim. Cruising nicely at about 30% power. Start a series of gentle S turns against the wind. Turns smoothly on ailerons only. Straighten up, throttle back to idling r.p.m., stick back — stall. I can see the slats clawing at the air as one wing and then the other rocks a little and the nose drops — stick forward, ease on the power. Slowly, very slowly, rotate the engines . . . Normal flight until the control comes back past the 45° mark. Then the aeroplane slows and when the 90° vector is approached it is necessary to let the nose down to keep the machine flying.

"It had been flying around inside my head . . . and there it was, at last, sitting pretty in the sky. Life must be awfully dull for chaps who do not design, make and fly aeroplanes. Poor devils."

I ease on a touch more power . . . Wing rock again — all quite controllable but this is the bird's maiden flight. I rotate the thrust vector back to 45°, retrim, throttle back to quarter power, retrim again, and set up a wide circuit at a slight rate of descent.

The air is smooth and the aeroplane likes it, sliding downhill, pretty as a picture. Down wind . . . Cross wind . . . Turn on to finals. Wings level. Beautiful. Swoosh — just in front of me at head height . . . Round out, not too quickly . . . Hooooooold it! The tyres brush the runway.

Taxi back to my car. Throttles back to idle cutoff. Silence.

The pint in my favourite pub en route for home tastes like nectar, the drink of the gods.

A thorough inspection followed. All well, nothing had shaken loose. The second, third and fourth sorties were flown shortly afterwards. On the climb out after the second takeoff something went awry at about 100 ft — the rate of climb dropped, no irregular harmonic exhaust beat and in the same second I noticed the stationary starboard propeller. Engine failure!

There was no violent swing to starboard — just a matter of throttling back, landing straight ahead and taxiing back on one. It was a rich cut. A click or two on the needle valve fixed things and the Aeropter shot off on its third takeoff.

This time I resolved to probe the flight envelope more deeply. Soon it was clear that flight with a generous thrust vector called for practice. I had an additional flying control — the thrust vector lever. Getting it all together would take a little while. Controlling the wing rock at low speeds tended to occupy my attention at the expense of the necessary control of the aeroplane in pitch. This problem was resolved by the installation of a rate gyro in the aileron circuit — a tiny autostabiliser.

Now it is practice practice practice, as in all life's endeavours.

Current experience suggests three principal thrust vectors: horizontal for cruise, about 50° for a short takeoff — depending on the rolling resistance of the airfield — grass or tarmac — and about 75° for the approach and short landing. This vector will be selected at the start of the steep, almost gliding approach. Very little power will be needed on the way down.

As the touchdown point nears, level out in the normal manner and, as the aircraft is held off, power is applied (not reduced as in a normal landing). The thrust vector will then be at about 90° to the ground. There will be no forward vector and the aircraft will slow down quickly and land as the wing lift decays. The ground roll will be much shorter than usual.

With improved dexterity it will no doubt be possible to approach with the thrust vector set to 90° or even 100°, to achieve a very short landing indeed; and if the surface wind equals touchdown speed, there will be no ground roll at all. Watch the birds and see how they energetically kill their forward speed immediately before touchdown.

I express my thanks to A. E. Tagg, formerly of Hawker Aircraft, and D. Parker of Somerset for the invaluable engineering assistance they graciously gave me in the execution of this project. I also acknowledge gratefully, and with admiration, the studies done in the past by my distinguished friend David Lockspeiser, former Hawker Aircraft test pilot, who incorporated the principles of vectored thrust in his Patent, Specification No. 1230381, of 1967. I pay the same compliment to Andrew White, formerly of Frazer Nash, who designed and built a sweptwing, tailless, radio controlled model in 1985 which has a vectored thrust (pusher) engine at the trailing edge of the wing's centre section (the position of the CG). I had the rare privilege of seeing this aeroplane fly, convincingly, in 1988.

Airship Industries' application of vectored thrust must be considered; the engines can augment helium lift and, more, when directed downwards, they can augment the Earth's gravitational pull. So I propose that the term Aeropter is limited to fixed wing flying machines having a thrust-weight ratio less than unity.

Aviation has developed remarkably quickly. Our hopes and dreams of spaceflight, longhaul intercontinental flying through to microlights, have all come true in 87 years. We have only just started! To meet our future needs, on land and sea, perhaps we will use vectored power.

As the author notes, Lockspeiser patented vectored thrust to improve Stol performance and control, and has proposed this research aircraft based on its LDA Boxer displayed at Farnborough 86.

Keller Motors For Electric Flight

For those who missed the excelent Ripmax show in January.

1) Basically there are 3 types of electric flight: Sport, powered gliders and speed models. Each of the three will require different combinations of motor, battery and propeller.

In the sport category are scale models, trainers etc., where maximum power is not necessary but duration is more important.
In the powered Gliders, these can be sub-divided into:-

a) Slow climb but long motor duration. (A "Hare or Tortoise" situation)
b) Quick climb with short motor duration.
and lastly,
c) Speed models where maximum speed for a given time is required.

2) To meet any of the above requirements, the motor/battery/propeller combination is different, and this discussion is to enable the correct choice for any particular need to be met.

3) KELLER MOTORS

Keller motors are a very high quality high specification hand built motor with rare earth magnets and suppressors already installed. Page 355 of ROBBE Catalogue tables the range of Keller Motors with classification, number of cells, prop sizes and wattage (i.e. power). This table also gives an indication of size and weight of model for each motor. The motors indicated by

Green are Standard motors with high windings and low current Popular.
Blue from 5 - 14 windings
Red Competition low double windings high current large cells.

From graph of a 40/10 motor at 12.1v (i.e., 12 cells as under load each cell is nominally 1 volt). The maximum efficiency is approximately 77% at an rpm of 7900 and a current of 11 amps giving 100 watts of power. The usable efficiency is about 70% which gives an RPM range of 6300 - 8200; the current will then be 7 - 27 amps - remembering that this is at one voltage the only variation is the propeller. So a prop size can then be chosen to give the required *a) duration* or *b) power.* If we now want to increase the voltage (on page 360), from this table line A, the revs per volt is 715; so for each extra cell there will be an increase of 715 rpm However that is free running and an approx. 200 rpm drop can be considered when using a propeller. So the useful increase in rpm will be 515 rpm/volt.

On the graph a new rpm line can be drawn parallel to the existing line but 515 rpm higher. The efficiency remains the same but the current and power can then be proportionately increased.

In conjunction with further information from Page 360, prop size and voltage can be determined. The extra information from this table running down is:

1) Voltage range
2) Number of cells
3) -
4) Revs per volt (free running)
5) Useful rev range
6) Maximum current for a 30 second burst (max. overload)
7) Current for maximum efficiency
8) Motor winding resistance
9) Motor length (less shaft)
10) Can Dia.
11) Weight in grams
12) Shaft dia.
13) -
14) Dia. of circle for mounting holes.

The dimensions of each motor are given in the attached tables. From this it can be seen that there are only 3 different can diameters - but different lengths - and only 3 dias of shaft. These are hardened steel with flats for location of props, and are virtually unbendable.

For rule of thumb for duration either:

One less cell
or
One winding more.

So a table can be made as a guide as follows:-

	Prop	then	RPM	Current	Efficiency	Running Time	Power
Increase	↑		↓	↑	↓	↓	↓
decrease	↓		↑	↓	↑	↑	↓

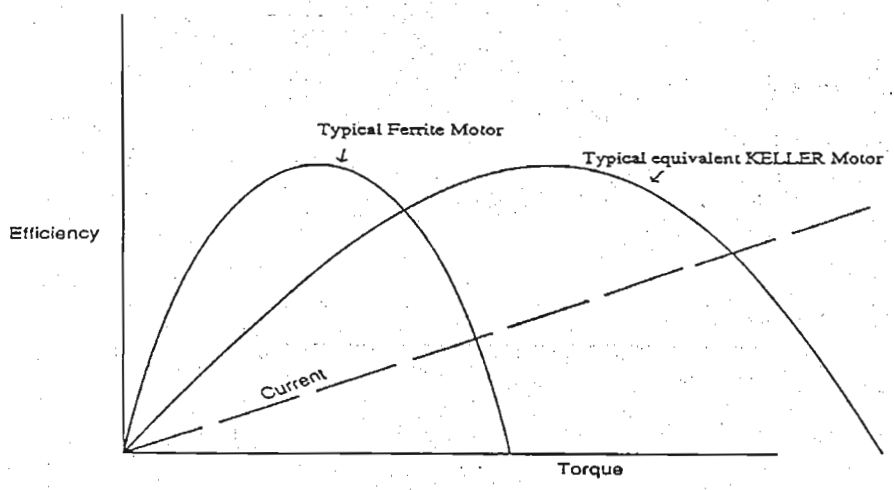
As an indication of the power of these motors, on Page 365 the Keller KE240/4 can run in an overload condition of 100 amps from 36 volts for 30 seconds.
This gives 3600 watts and at 70% efficiency this is 2570 watts or 3.36HP.

3a) STANDARD FERRITE - BUGGY TYPE - 540 MOTORS

At the cheaper end of the market standard ferrite motors can prove adequate for some applications. These motors normally fall in the 7.2 - 8.4v battery category and use 15-20 amps continuous current. This means the maximum power could be 140 watts which, if working at maximum efficiency of 70%, given 98 watts or .13 HP. The equivalent KELLER can run on 8 cells and at a maximum current of 50 amps gives 400 watts, at 70% is 280 watts or .37 HP.

From the efficiency curve comparisons above it can be seen that the Ferrite motors only work satisfactorily over a narrow rev range. So for larger props, to allow the motor to run efficiently, a geared system must be used. For example the GRAUPNER direct drive system uses 6 x 6 or 7 x 3 folding props, whereas their geared system uses from 10 x 6 to 11 x 7 folding props.

The standard range of Kyosho ferrite motors range from 12 doubles to 10 doubles, or 550 type. However the cheapest stock motors have either 20° or 34° of advance. Kyosho also make a geared unit - as used in the Valencia - which uses a Kyosho 360 PT motor, with a 9" broad bladed fixed propeller.
For smaller models, there are 380 motors such as Le Mans AP29 or AP29BB.



REMEMBER

If you put your hand into a glow motor when running, although damaging you, it will stop. An electric motor will keep running and therefore do more damage.

KEEP ALL HANDS AND LOOSE OBJECTS WELL CLEAR OF ELECTRIC PROPS - WHETHER FOLDING OR NOT.

4) BATTERIES

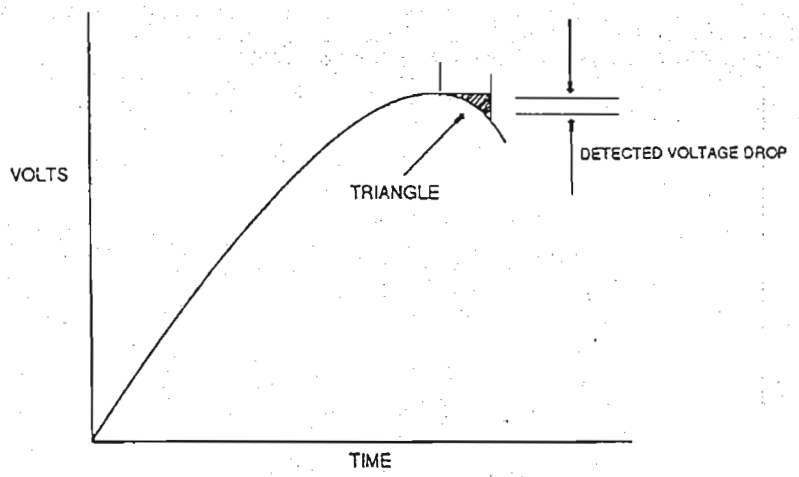
There are 3 ratings of batteries for electric flight.

Low class motor i.e.	12 - 15 amp	cheap batts. 1200, 1400 or 1300 SCE
Mid Class	15 - 20 amp	1700 SCE
High class	OVER 25 amp	SCR cells

All KELLER Motors run most efficiently using SCR cells, and at these high currents 4 mm wire with 4 mm gold connectors (Pages N81 & N82) are essential to get the most out of the motors.

5) CHARGERS

SCR cells can be quick charged, but a peak detector charger is extremely useful. The ROBBE chargers (PAGE 316 & 317) cover from 6 cells up to 21, each from a 12v source. These are peak detectors but maximum charge only occurs up to 70% of battery capacity, then charge rate drops so that the batteries always remain cool which then allows a higher charge capacity.



In Greek δ is a Triangle, hence 6 peak chargers. The 14 & 21 cell chargers are also inventers, so these will charge from a 12v source. The charge current can be varied depending on the type of cell, and normally takes about 1/2 hour to fully charge.

6) SPEED CONTROLLERS

There are various types of speed controllers:-

a) On/Off micro switch
b) Resistor type
c) Electronic

The on/off switch type is all right for small models with non-folding props and when a channel is not available from the radio.

The resistor type is not recommended, since the excess current that the motor does not use, is dissipated in heat. Also the length of motor run is the same whether using slow speed or max.speed.

If a folding prop is used with a resistor type speed controller, the blades can freewheel not allowing them to close, hence more drag.

There are 2 types of Electronic speed controller.

i) BEC Type
ii) Non BEC Type

The BEC Type can only be used up to about 25 amps continuous rating, since above this can occur if there is a direct coupling between the power battery and receiver radio interference can occur. Also with a BEC type, it must have a power cut off, so that the motor stops before the battery is flat allowing about 10 minutes of radio function. The FUTABA MC114 is a good example of the above requirements at a reasonable price.

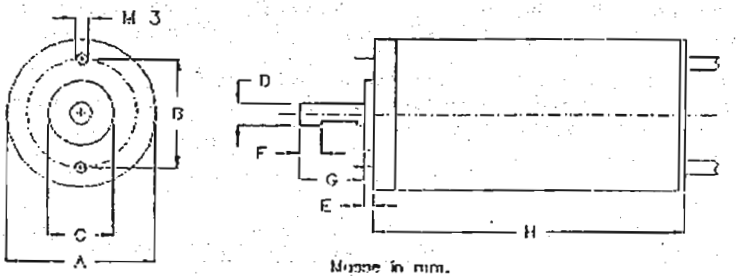
Page N75 shows three different ROBBE electronic speed controllers capable of handling 7.2 to 32.4 volts and an amperage range of 30 - 80 amps continuous current. These controllers have a soft start feature so that the motor will not overstress the folding prop when opened from zero to full throttle. Also there is an E.M.F. Brake in the off position which prevents the motor turning, hence allowing the prop to fold correctly.

In conclusion, Electric Flight is an exciting quiet efficient alternative to gloplug engines. However, an efficient system is not a cheap alternative, and the power that can be got out of the motor is dependant on the power put in, i.e., more cells more power ! !

MODELS FOR ELECTRIC FLIGHT

ROBBE	Scale	Dornier Do 228 Twin	Page	N17
		Pitts Special		75
	Trainer	Bingo E		N11
	Sport/Glider	Varta Fly		N5
		Finesse		N7
		Kormoran		N15
		Arcus		65
		Gamma		61
		RC Uno E		63
	Pylon	Speeder E		71
		Micro Racer		73

GRAUPNER	Sport/Glider	Chip	Page	8	New Items 89
		Electro Uhu		2	New Items 88
		Electro Pink		10	New Items 88
		Silentus		84	
		Ultra Fly		88	
		Electro Junior		6	New Items 90
		EPS 2000		12	New Items 89
		Cherry		10	New Items 90
		Chili		8	New Items 90
KYOSHO	Sport/Scale	Valençia 1800	Page	96	
		Melody 380HP		101	
		Stratus 2000		98	
		Petit Fantasy		90	
	Aerobatic	Flash EP		93	
	Scale	Cessna 177 Cardinal		94	



Masse in mm.

Type	A	B	C Tol $^{0}_{-0,043}$	D Tol $^{-0,004}_{-0,009}$	E	F	G	H	Gewicht (g)
KE-540	34,5	25	13	3,175	2	–	10,5	57,5	200
KE-22	34,5	25	13	5	2	5	21	64	250
KE-25	34,5	25	13	5	2	5	16	69	290
KE-35	34,5	25	13	5	2	5	17	76	340
KE-40	34,5	25	13	5	2	5	23	82	360

robbe GmbH

Masse ohne Toleranzangaben nach DIN

	Datum	Name
Gez.	22.2.90	H. Spl.
Gepr.		
Gen.		

Kartei-Nr.: KE22-431

Ers. für: / Ers. durch:

Maßstab | Rev.

Werkstoff:

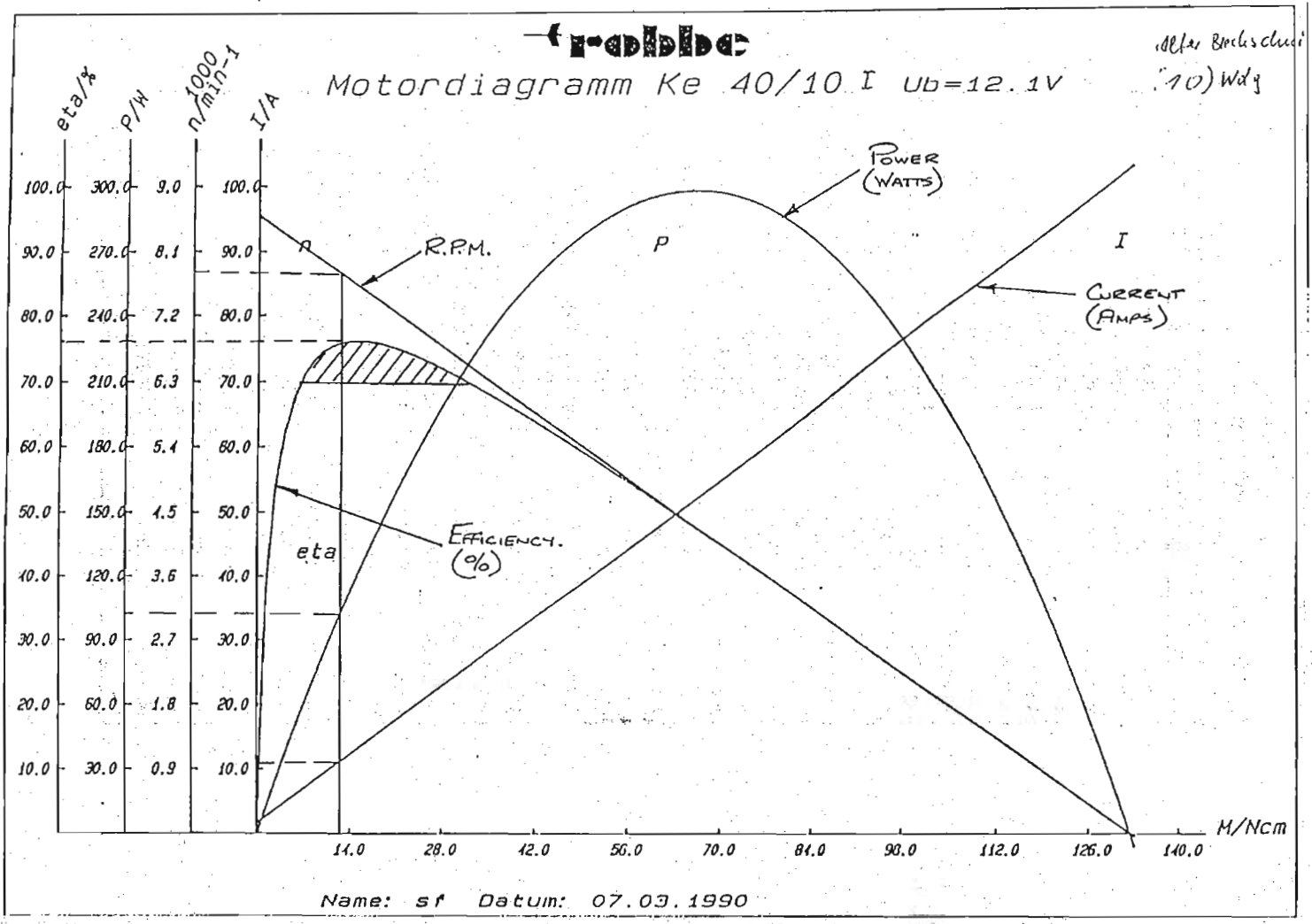
Bezeichnung:

Einbaumasse fuer KE-540, KE-22 – KE-40

Zg.-Nr.

Blatt 1 von 1

Ifd. Nr. | Änderung | Datum | Name


Motordiagramm Ke 40/10 I Ub=12.1V
eta/%
P/W
n/1000 min-1
I/A
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
300.0
270.0
240.0
210.0
180.0
150.0
120.0
90.0
60.0
30.0
9.0
8.1
7.2
6.3
5.4
4.5
3.6
2.7
1.8
0.9
n
R.P.M.
P
POWER (WATTS)
I
CURRENT (AMPS)
eta
EFFICIENCY. (%)
14.0
28.0
42.0
56.0
70.0
84.0
98.0
112.0
126.0
140.0
M/Ncm
Name: sr Datum: 07.03.1990

Membership Telephone List

Last Name	*First Name*	*Telephone*	*SAA Cert.*
Adamson	William	06517 2221	
Allan	Douglas	790500	
Anderson	James	594885	
Bain	Douglas	685843	
Barnes	John	06512 2368	
Boone	Simon	780448	
Brown	Angus	0569 64144	Silver Sport
Cowieson	Ian	820037	
Cowieson	Scott	820037	
Davidson	David	692922	
Dempster	Leslie	402	
Donaldson	Graham	486961	Bronze Sport
Evans	Finlay	625556	
Grant	Ronald	714454	
Greenlee	David	322018	
Hamilton	Tom	310306	
Holt	Richard	06513 2777	Silver Soaring
Irvine	Graham		
Kerr	Norrie	324722	Silver Soaring
Lock	Ron	733693	
Logan	Neil	06517 2647	
Masson	Jim	896794	
Mitchell	Gerry	324828	
Morris	Dave	742776	
Macpherson	Tom	0569 63868	
Mcconville	John	824179	Silver Power
Norris	Dave	740374	Silver Soaring
Ord	Brian	698449	
Philip	Graham	0569 64209	Silver Sport
Satterley	Malcome	0569 62980	Silver Sport
Scott	Craig	0569 64905	
Sherriffs	William	06517 2590	
Smith	Allan	321536	
Stark	Bill	640560	
Stewart	Alan	722663	
Stewart	Colin	722663	
Thoirs	Andrew	712008	Silver Soaring