

ROTORUA MODEL AIRCRAFT CLUB (INC)

September 2021 NEWSLETTER

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Sub for the 2021 - 2022 year RMAC MFNZ TOTAL
are

Family	\$120	\$100	\$220
Senior	\$115	\$95	\$210
Junior	\$45	\$30	\$75
Associate	\$115		\$115
(member of another club with current MFNZ membership)			
Social non flying	\$50	-	\$50

Payment can be made to ANZ account # 116102_ 0913131_ 11 Include your name in the details

Welcome to the September 2021 newsletter.

Flying activities came to an abrupt halt in the middle of last month with the latest covid restrictions. There was however some activity earlier in the month although conditions were far from perfect. Dave L and John R managed to record some times for the NDC Vintage precision event.

Dave Bailey trialled his new Cub. A delightful machine with a four stroke up front.



Looks like there has been some building going on to break the cabin fever of lock down. Dave Bailey has been busy during lock down building a Topsy which is coming along nicely.



Looks like a 46 Four Stroke in this one

Transmitter pulse lengths (another time wasting project)

As mentioned in an earlier newsletter I invested in an Arduino beginners development kit. After enduring 67 tutorials on the internet one has a very basic understanding of how to programme it to do various things. One of the things I've managed to do is to measure the servo pulse lengths at the receiver outputs. This is interesting stuff as we can compare different sets. The following table sets out the results from four sets. All were set to their factory defaults and trims set in the centre The 7C set came from a Tauranga auction in damaged condition for an outlay of just \$5. After a bit of work it has been used as a buddy box. The Sky Attack set was made in the mid 1980s

Radio				
All measurements in Microseconds				
FutabaT6K		2.4 Ghz		
	Channel		centre	
	1	1106	1503	1921
	2	1106	1503	1921
	3	1106		1921
	4	1106	1508	1921
Futaba 6EXA				
	Channel		centre	
	1	1058	1495	1936
	2	1101	1537	1920
	3	1107		1924
	4	1102	1528	1940
Futaba 7 C		40 Mhz		
	Channel		centre	
	1	1107	1519	1926
	2	1100	1519	1932
	3	1144		1930
	4	1147	1528	1916
Futaba Sky Attack		40 Mhz		
	Channel			
	1	1096	1540	1941
	2	1120	1545	2007
	3	1074		2006

Well what does it all mean and what else did we find

All the radios show remarkable consistency.

At the default setting of 4 each click of trim adjustment is 4 microseconds. This works out at less than 0.35 degrees of servo rotation on a standard servo. I didn't get round to measuring the dead band on various servos. Dead band is the change in input signal required before a servo starts to move. However if this lock down continues much longer it could happen soon.

ANDYS TYPHOON

Andy has been busy finishing a FMS 1100mm wingspan Typhoon complete with retracts and flaps! The Thyphoon was one of the fastest aircraft of WW2 so that's right up Andys alley.



ANOTHER VINTAGE MODEL UNDER CONSTRUCTION

Now some pictures from Des of his handy work. A Powerhouse Sal Taibi design from 1939. With an OS48FS up front and 7ft wingspan this will be a superb model built to Des's high standards. Des picked up the kit at the Tauranga auction which just goes to show not everything at the auction is recycled junk.



Recently the committee decided to replace the small mower with a larger model with a bucket and spray unit. So far, we have been successful with funding applications to The Rotorua Trust and The Aotearoa Trust. We expect to hear shortly if another application has been successful. An application has also been made to MFNZ for funding for an electric fence more about this in Dave's report.

Last month Dave provided the first part of a very interesting flight round The Isle of Wight. Taking nearly two hours to cover 59 miles. This month Dave completes the story with the second part. (Looks like they used a Futaba Gold box radio)

Back in 1955 the first crossing of the English Channel by a model aircraft was achieved. This took 40min to travel 22 miles. Radio was a 3ch reed set. (i.e. 1ch for right 2nd channel for left and not proportional). The story is told below and it is interesting to compare the technologies used to achieve the two flights.

Channel Hop!

January 1955 Model Airplane News

January 1955 Model Airplane News

On September 22, 1955, Londoners Sid Allen and George Redlich guided their 6-foot wingspan "Radio Queen" across the English Channel from the white cliffs of Dover to Calais, France, marking a first in the model aviation world - a mere 40 minutes in duration. It was approximately the same path that Louis Bleriot took in 1909 when he became the first to cross the English Channel in an aeroplane using his homebuilt XI Monoplane. As with many (maybe most) record-setting model aircraft flights - be they distance or duration - a diesel engine (ED 0.213 cu. in. Hunter Diesel) was used as the powerplant due to their reliability (no glow plug or spark plug to burn out or foul) and fuel economy. Takeoff weight was 7-1/2 pounds, with 1-1/2 pounds of it being accounted for by three pints of fuel. Guidance was provided by an ED Mk. 4 Miniature, 3-reed type, from the cockpit of a [Auster Autocrat](#) monoplane.

See all [Model Airplanes News](#) items.

Channel Hop!



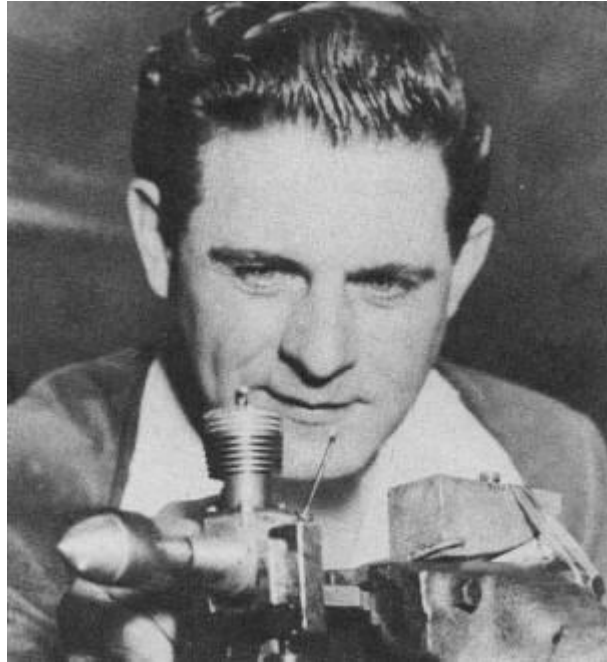
Big moment, as Roger Clark launches 6-foot Radio Queen (with three pints of fuel aboard) on its historic 22 mile flight across the Channel to Calais in France.

During the 40 minute Dover-Calais flight, the model attained 3,100 feet after 17 minutes, had to be spun down 1,100 feet. The ceiling was estimated to be 4,500 feet.

By Bill Dean

The world went wild 45 years ago when Louis Bleriot flew the English Channel. Now the crossing has been made by model airplane, taking only three more minutes than did the great French aviator. Here is the story behind that exploit with pictures, by courtesy of the London Daily Express.

Ever since RC flying got under way in the 'thirties, modelers on both sides of the English Channel have been dreaming of the day when a model plane would fly along the same sky trail blazed by Louis Bleriot on his epoch-making hop across the 22-mile wide strip of water, 45 years ago. The dream at last became reality on Wednesday, September 22 of this year, when Londoners Sid Allen and George Redlich guided their 6-ft. span Radio Queen across the "ditch" from the white cliffs of Dover to Calais, France. Total time for the crossing was 40 minutes - just three minutes longer than Bleriot's own hazardous trip in his flimsy XI Monoplane back in 1909!



Basil Miles, designer of the .213 Hunter Diesel, checks powerplant for the Allen-Redlich project on the eve of the cross-channel.



No beauty, the first across-the-channel plane is an ED kit, popular abroad. The radio is an ED Mk. 4 three-tube type, making an all ED project.



Sid Allen, noted British RC flier, placing air mail letter aboard. Note the two transparent fuel tanks in wing.



Customs Officer clearing the Radio Queen before its take-off from the white cliffs of Dover. Numerous long-duration test flights had been made.



George Redlich, the radio expert, in cockpit of Auster Autocrat, from which he controlled model. Control was maintained throughout the flight.

Ranking as one of the most important firsts in the history of model aviation, the flight was especially notable since only standard model equipment, of the type available in any British or American hobby store, was used. The actual model was built from a well known kit design by Col. Taplin, which has probably won more contests than any other RC type, including two firsts at the '54 British Nats. Radio was an ED Mk. 4 Miniature Three-Reed type and the powerplant was an ED .213 cu. in. Hunter Diesel.

For several months prior to the crossing, Sid and George logged dozens of long-duration test flights, checking out various tank schemes, and generally satisfied themselves that it could be done. Basil Miles, ED's engine designer, personally okayed the veteran powerplant and found that no special tuning was needed; twin wing-tanks were fitted (feeding a float-chamber behind Diesel) and a long downward-pointing exhaust was fitted to keep the radio compartment under the wing free from waste fuel.

Over the past few years, several much-heralded "channel attempts" fizzled out and the newspaper boys have been becoming increasingly bored by the "I'm planning to fly the Channel" utterances of the beep box characters. However, after hearing all about the carefully laid plans for the Allen-Redlich flight, the Daily Express - one of the world's two largest newspapers - quickly jumped on the "Bleriot rides again" band-wagon and from that point there was simply no turning back! Additional interest developed when it was learned that a rival group headed by Ballard who hit the headlines in '52 by making the channel crossing with an RC model boat, were also planning a model plane crossing, escorted in this case by a fast motor launch.

When the big day dawned, everything was just fine from the publicity angle, with a light plane all ready to follow the model, British Customs Officers giving clearance and even an air mail letter being sealed in the cabin! The only thing that remained was the little matter of skipping across the intervening 22 miles of wet stuff that separates Britain from France - which is not such a straightforward task as it sounds, since the area is known for its frequent weather changes. Also, even if helpful

offshore winds usually prevail for the first few miles from Dover, these soon give way to strong land breezes blowing from the French coast.

At 1 :35 p.m., with George Redlich already circling overhead in a high-wing Auster Autocrat, Sid Allen pressed the transmitter button for a final control check and then signalled helper Roger Clark to heave the model skyward. Weight at launching was 7-1/2 lb. (with 1-1/2 lb. of this being accounted for by three pints of fuel) and although an unaided take-off had originally been planned, the long grass on top of the 600-ft. high Dover cliffs made this impractical.

Once airborne, the job climbed steadily, with air control being taken over a few minutes later by George Redlich (someone else flew the light plane!), who carried the second transmitter in his lap. Weather conditions at the time included a layer of high cloud and scattered strata-cumulus with bases at 2,000 ft. Wind at 2,000 ft. was approximately 40 miles an hour from the northwest, with ground visibility being limited to about nine miles on account of heavy haze.

The 90 hp Cirrus-powered Autocrat was chosen as the escort aircraft since it could be safely flown in steep turns at 40 mph, plus the important fact that the generous cabin windows and all-perspex cabin roof provided good all-around visibility. Pilot Norman Ashe soon realized that it would be all too easy to lose sight of the model at distances much over 300 yards, so to slow down his ground speed to match that of the Radio Queen, he had to fly a continuous figure-eight pattern. This naturally rendered the magnetic compass useless and toppled the Gyro direction indicator, so from there on the route had to be flown entirely by visual reference to the indistinct outlines of the British and French coasts.

It was found best to fly slightly beneath the model as it stood out in sharp contrast against the sky. Stopwatch and altimeter checks showed that the model climbed to 1,000 ft. above sea level in the first eight minutes after launching and then from 1,000 ft. to 3,100 in 17 minutes. At this point George decided to spin it down to the 2,000 ft. level again (no elevators were fitted), where he breathed a big sigh of relief when the wings didn't fold on the pull-out. Several such dives were necessary to keep the model from climbing to its estimated 4,500 ft. ceiling, at which it would have probably overshot the target, on the glide!

Apart from a slight tendency to turn left, which was corrected by right rudder application at one-minute intervals, the flight was otherwise uneventful until the French coast was crossed at 2:15 (40 minutes after take-off), with the Hunter still droning on steadily. Control had been maintained at all times, but after George brought the model down to 800 ft., he unfortunately lost sight of it and after a fruitless search was forced finally to put down at Marck Airport, Calais, without knowing its whereabouts. Happily, the model was soon located in perfect condition in a field five miles to the southeast of Calais, to the relief of its co-owners, who were already well into planning their next big flight - that of having a crack at the long distance record at present held by the USSR!

FROM THE PRES

As I write this, we are at L3. Spring is here, and hopefully L2 is not far away, when we can resume flying, albeit with limited restrictions.

I have submitted a request for a grant covering the material cost of an electric fence to MFNZ and this is on the agenda for the next council meeting in early September.

The proposed fence will be all round the field N, S and W boundaries and down the runway thus giving 360deg protection. An electric fence solved the pig problem at TECT park, but obviously it adds a future maintenance burden at the field. Unfortunately, without the fence we soon won't have a useable runway so it's a pretty necessary item.

Does any RMAC member have a Farmlands card? When we buy the materials, we can save 5% if we can buy them through a card.

John Ryan is also active on the grants front, seeking money for a new lawn mower. He is closing in on the required amount, and I am sure he will cover his progress in his bulletin section.

With hardly any flying this month I hope you were able to hit the workshop in between catching up on family maintenance etc. duties and make some progress on aeromodelling.

Last 2020 lockdown I started my Sopwith Strutter biplane build, which took me to October to finish, so this time I decided to keep it less glamorous and lengthy

My lockdown modelling time has focussed on CL stunt model developments and since I am the only CL flyer in the club, I doubt they are understandable or of any real interest, but here goes. *(Ed some useful info on tank plumbing here that works well in R/C models)*

My Inter-trainer 1 model was created earlier this year to hopefully get me into the new Intermediate CL aerobatic class I needed a tough model that would hopefully withstand the ground impacts that will undoubtedly occur, hence the conversion of an FAI combat model.

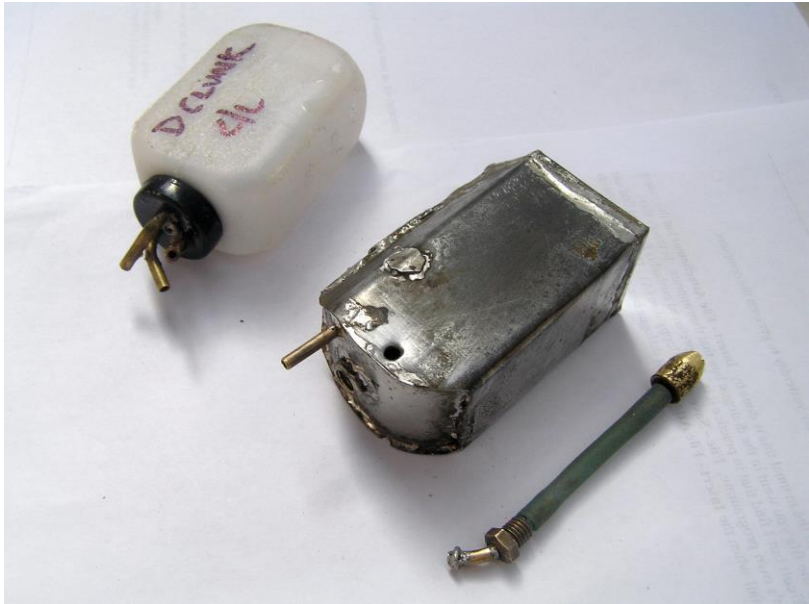
The model flies well and looks like it will do the job, but the fuel tank was too small. I had used a standard RC 2oz Dubro plastic tank built into the LE of the wing. This was a double clunk unit, similar to that as used on my RC models. On both RC and CL, I have found that double clunks, with the pressure feed on the second clunk gives a much more reliable fuel supply than the conventional single clunk. Every model I build now has a double clunk tank.

The next size of Dubro tank was too big, so I was forced to fabricate my own out of tinfoil. I needed a 50% increase in volume. This was achieved and the model is now awaiting L2 for its next flight.

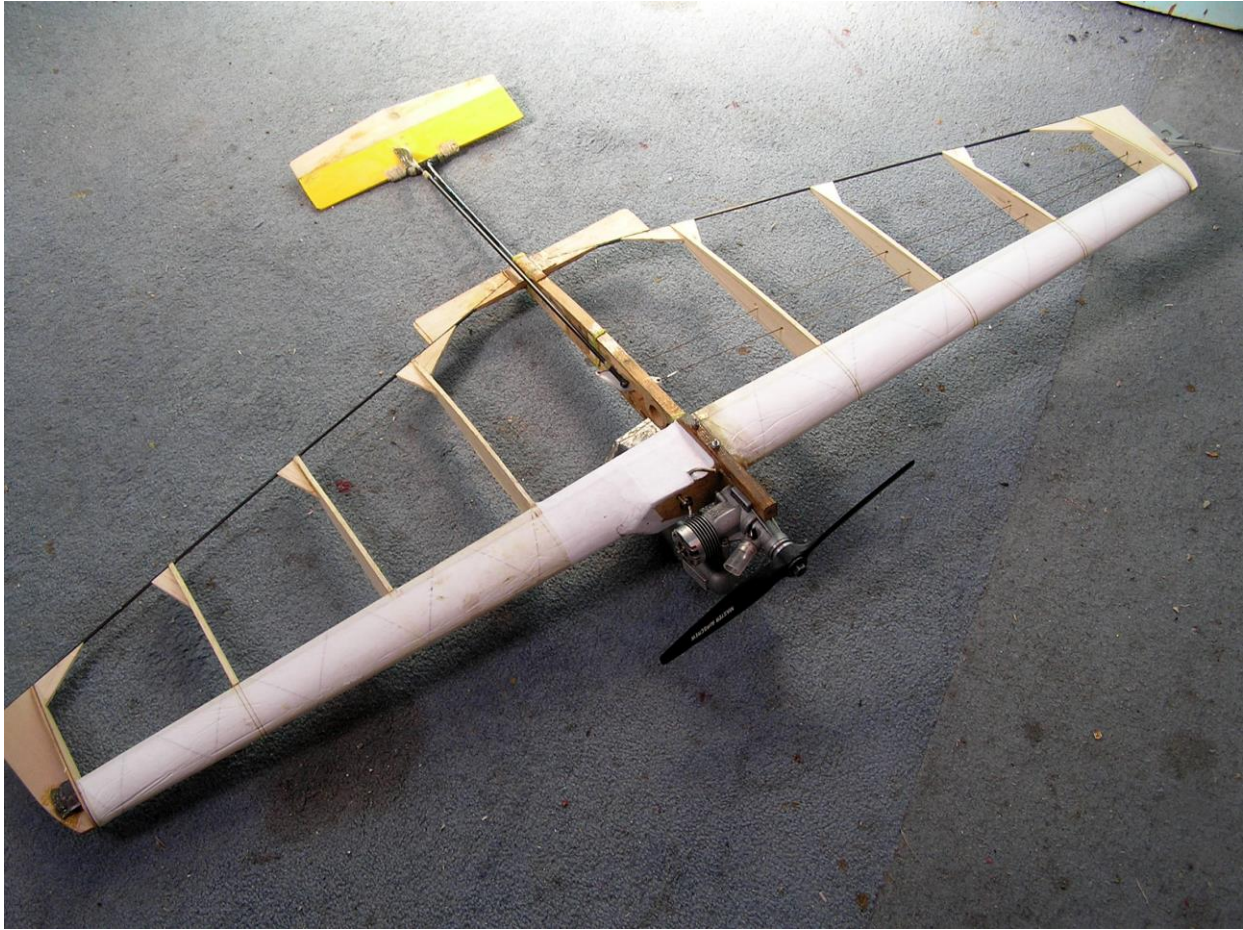


Inter-trainer 1 with new double clunk tank ready to fly. Hopefully an engine run of seven minutes will be achieved with the larger tank.

I then decided to build an Inter-trainer 2 model with a schnuerle ported OS25 engine which although 100grammes heavier than the cross flow OS25 in inter-trainer1, will provide more power for overhead manoeuvres. This has taken up most of the lockdown, especially since I also decided to use a single clunk tinfoil tank but with a fixed pressure supply in the normal uniflow position. According to CL forums these work well. We shall see. It's almost ready for covering and hopefully will be a further improvement on the first model.

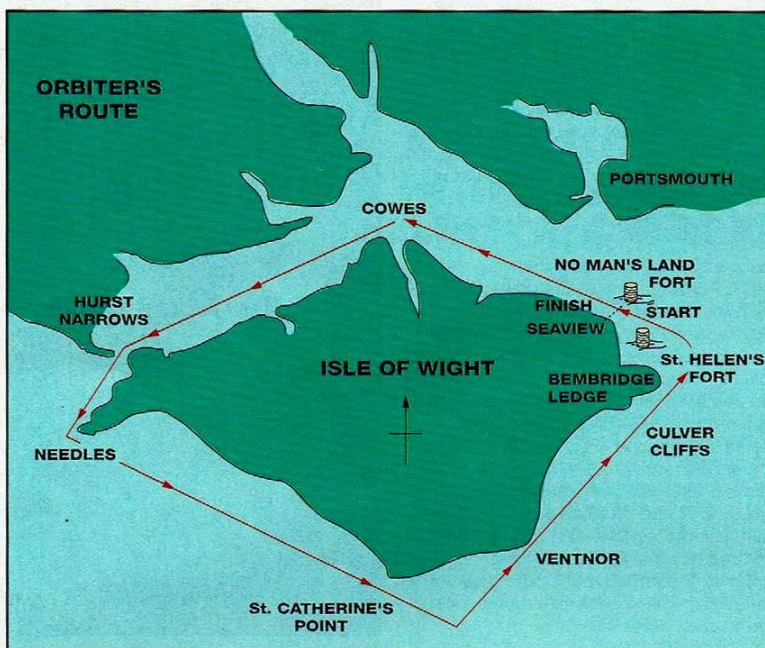


Standard 2oz Dubro RC tank alongside tinplate single clunk tank with fixed uniflow pressure supply. The hole in the top is for the vent which can only be soldered in place after the tank is in the wing.



model Inter-trainer 2 with single clunk uniflow tank. Note the longer tail moment arm compared to Mk1 due to the heavier OS25 The fuel tank is buried in the LE and the top vent now installed. This is blocked after filling.

Last month I published the first instalment of [Operation Orbit](#). I hope you found it an interesting read of somebody having fun flying a model aircraft. (With all the rules and regulations nowadays, the fun police seem to be determined to stop real enjoyment in model aircraft flying.) Anyway, Part 2 follows in which JC ponders on girls in bikinis, whilst enjoying a G&T at the end of the attempt.



(BELOW)
Engine started
and ready to
launch.



Taxiing out to
take-off.

We transferred the aircraft and equipment from car to boat and slipped across the Harbour to Camper Nicks' refuelling barge but a notice announced that it would be shut until 0900. Not wanting to hang about for fifty minutes or so we decided to head back for Cowes, see how the sun was burning off the fog and pick up some diesel at an 'all night' refuelling point. The vis. was about a mile or so outside the Harbour. We headed for Cowes and about half way we slammed into a fog bank. Barry throttled right back and from then on it was Decca all the way.

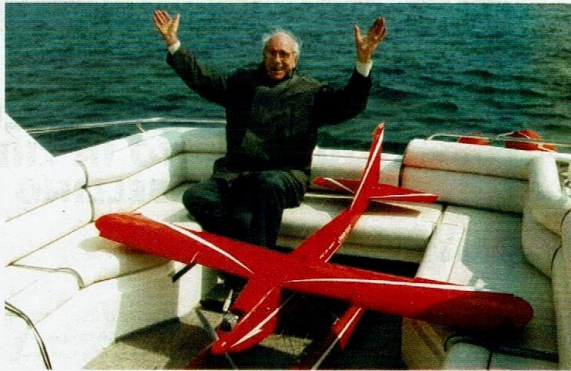
Jolly accurate stuff, Decca. Barry had put the Lat. and Long. of Prince Consort (a well known sea mark off Cowes) as one of the 'way points' into his Decca - and we damn near hit it! In all my years on the Solent I've never been so close to it. Next, we nearly fetched up in the Members Dining Room of the Royal Yacht Squadron. Anyway, we finally arrived safely at the refuelling point and shortly afterwards the sun started doing its stuff. By 10.30 we could see a mile or more and decided to head East for the Start and Finish Line which we proposed should be between No Man's Land Fort and the Seaview Yacht Club. The conditions seemed to be satisfactory en route; murky, mind you, but Barry said he had primed his Decca with suitable 'way points' round the Island and his compass was fairly accurate, and anyway, we didn't want it too easy, did we?

So, the attempt was ON - and we'd go anti-clockwise keeping the Isle of Wight to Port at all times. As I pumped four pounds of fuel into the aircraft's tank I suddenly got frightfully cold feet. "Whose stupid idea was this?" I cried. "Yours," said Barry. "Rot," I said, "it was yours, last August." My chummo made some footling remark and I felt really miserable. Would I ever see my lovely seaplane again? Would it fly into some monster fog bank even now rolling across Poole Bay towards the Needles. If so, I would lose sight of it and then - finito...oh well...No turning back now. Fuel tank full, all pre-flight checks complete. Engine start-up, no problems, 10,000 rpm at full throttle, nice idling, A-OK. Barry stood on the bathing platform at the stern of his boat and I handed him the aircraft. We were both very mindful of the killer prop whistling round at the front end. With

great skill, dexterity - and courage - Barry lowered the aircraft into the water and let go. It moved away rocking on the unfamiliar wavelets. It answered the helm nicely Barry scrambled forward - and then his Cell Phone rang! The caller was informed that we were busy. Then Barry picked up his video camera and the cursed thing didn't work. He shook it. "Damn, it has never not worked before." By this time I had strapped the transmitter around my neck and had taken up my position riding shotgun beside the driver. Barry put the video camera away and took out a 35 mm camera. Strewth, I thought, how long is he going to take over all this? (Mind you I was very grateful afterwards that he had gone to all this trouble) Finally, he put the camera away and said: "Ready?" I nodded. We turned westwards against the gentlest of breezes. The model on our starboard side about thirty feet way. I checked the position of the elevator trim on the transmitter, all the way up, stick back and slowly opened the throttle for the aircraft's fourth take-off, the first at sea and the first with four pounds of fuel on board. No problems, the wavelets helped; the model shot forward, bounced gently bounced again and lo! airborne. We surged forward in the Sunseeker. I let the model climb to about two hundred feet and slowly throttled back. From the three previous flights I knew where to position the throttle on the transmitter for the cruise - no longer, of course, could we hear the aircraft's engine. The sea, for us, was wonderfully smooth, hardly a ripple. I settled back, feet on the cabin bulkhead by kind permission of B Stobart-Hook (the aircraft up at an angle of about forty five degrees straight ahead and trimmed to fly hands off. All OK). The aircraft and our boat were cruising nicely together. "30 knots," yelled Barry, "our best cruising speed." The model was silhouetted against a bright blue sky.

THE LONGEST DAY

Out of the corner of my eye I could see that Barry was working hard, peering frequently at the Decca read-out - then back to the compass. From time to time I could just see the Isle of Wight shore to the left and sometimes England's shore to the right but not often. Not long after the start Barry yelled that there was poor viz ahead. I asked if we could go round it and I think Barry did a sort of dog-leg. I was concentrating on the aircraft to such an extent that, fortunately, I hadn't time to worry. We were not exactly being a danger to shipping, 30 knots in a visibility of a mile or so is OK providing you keep a very, very sharp look out indeed, and not only for shipping - there's an awful lot of rubbish floating around in the sea and a log the size of a railway sleeper would put a six foot hole in our hull and send us to the bottom in sixty seconds, ruin our day.



"Coves coming up," yelled Barry. Coves! Heavens, I thought we'd be off Yarmouth. This was going to take longer than I thought. Relax. Only done about a quarter of an hour. Well, the big bird looks OK and the healthy sound of two Volvo diesels at cruising rpm was most re-assuring. Barry warned me when he was about to alter course, mostly to Port naturally, and also when we were about to hit some wash and when he did I took my hands off the transmitter's controls for fear of sending an involuntary signal up to the Orbiter while bracing myself by pressing against the cabin bulkhead. And so the long day wore on.

I peeped at Yarmouth deep in the mist to Port and wondered if Barry would have to take avoiding action round one of the Yarmouth / Lymington ferries. Apparently not. Hurst Narrows coming up, very slight cobble-stone effect. Into the Needles Channel - and there far ahead off the Port bow were the Needles. Nearly half way! It was about then that I allowed myself the rather cocky thought that maybe, maybe, the bird might make it all the way round. I wished I could hear its engine but then, I'd only worry. The bird looked good - and sort of confident. The vis. increased to about two miles as the Needles flashed by to Port and it was then I noticed that Barry had unshipped his camera and was snapping away at me with the Needles in the background. A South Easterly course now for St. Catherine's Point. The sea was calmer than the Solent! It was like glass - but the vis. dropped and the shore-line disappeared in mist - back to the Decca read-out and the compass. Due to the horizon to horizon mist and the unbelievably smooth surface of the sea I felt almost that we were flying, tucked in astern of the model. The thought occurred that I might bring the model down and formate it alongside. Rather fun, and Barry could get a good snap of it. But I fought against the wheeze because if we had to take rapid avoiding action it all might end in disaster. We might have met a couple of idiots flying a model aeroplane round the island the other way.

The two legs south of the island seemed tediously long - to a way point off St. Catherine's Point and then North East to the Bembridge Ledge. We did actually see the St. Catherine's Point lighthouse and in due course Ventnor. Then long periods of all-round mist until, after a very long time, the white face of Culver cliff showed up, faintly, to Port. By this time the aircraft had been flying for over an hour and a half and it was noticeably lighter. I had to squeeze the throttle back to prevent it from climbing. I looked down at the throttle control and was surprised to see it only about one third the way forward. The aircraft was cruising on very little power. Barry warned me that we were about to turn, gradually, through ninety degrees to Port round the Bembridge Ledge and on to our final leg. Shortly I saw the Bembridge Life-Boat Station, then the entrance to Bembridge Harbour, then St Helen's Fort and then Seaview coming up over the Port bow! I peeped to the Starboard bow and there it was, No Man's Land Fort looming up! A few minutes later Barry thumped me on the back. "DONE IT", he yelled.

PHEW!

Barry slowed and stopped our boat. I stood up - which way was the wind coming from now? What there was of it - from the South East. I turned the aircraft gently through one eighty degrees to the left - approximately into wind. Throttle back a little and descend. She looked good - about a hundred feet away - wings level - slowly round out - throttle back to fast idle - the floats brushed the sea and she slithered to a walking pace. I

turned the aircraft towards us. She approached making that curious flicking sound as spray from the floats hit the prop. Barry clambered out onto the bathing platform and when the aircraft was a few feet away I throttled back to idle cut-off. Silence. The model drifted into Barry's hands and he lifted out of the water and gave it to me. I placed it on the floor, pardon, deck. Barry rushed forward, grabbed his camera, turned and pointed it at the aircraft and myself - you can see the result.

The aircraft had flown for one hour and fifty four minutes and when I removed the wing we could see that the fuel tank was still just over a quarter full. The engine had consumed just under three pounds of the methanol mix. I didn't check the state of the aircraft's battery then but later I learnt that it was only partially discharged; because the air was so still she more or less flew herself and the servos controlling the surfaces were not used much.

We washed the aircraft down with fresh water and then Barry gave me the most gorgeous Gin and Tonic I have ever had in all my puff!

Why did we do it? Well, what's the Isle of Wight for - for goodness sake!

My thanks to Mick Charles for the floats and of course, to Barry Stobart-Hook who did all the work. The sea state and calm air were perfect but it was a shame about the poor visibility. Had it been clear, as it so often is, Barry could have had a relaxing ride while waving to all the good looking girls in their bikinis on the way, as it was the poor old stick had to work like a one arm paper hanger. Thanks chum

(ABOVE LEFT) The Needles - half way!

59 miles in 1 hour 54 minutes.

DATAFILE

Distance:	59 miles
Time:	1 hour 54 minutes
Aircraft name:	Orbiter
Designed by:	John Crampton
Wing span:	6 ft. 6 inches
Length:	6 ft.
Empty weight:	10 lb.
Fuel capacity:	4 lb.
Engine:	O.S. 70 Surpass four-stroke (11.5 cc)
Propeller:	12.5 x 6"

Another article I recently came across during my (long) lockdown tea breaks comes from an old IMAC Giant Scale Handbook.



For those that don't know, IMAC now focusses on aerobatics performed by RC scale models of full-size aircraft, in contrast to the pure aerobatic or pattern models used in other classes.

This handbook is an older one when 'giant' referred to models with a wingspan of 2.5m and petrol engines were mainly home conversions of chainsaws etc. We are now used to modern models which considerably exceed what was considered "giant" when it was written.

It contains some interesting reading however, and one article covers model design and aerofoils at a reasonably basic level.

The first part (that follows) should be of interest to anyone who wants to know more about model design and making a model aircraft fly well.

The second part, that I will include next month, has some quite extraordinary, but convincing, statements and claims on biplane design and aerobatic/sport plane aerofoils. Anyone contemplating building a new RC sport model wing will find it challenging.

AIRFOILS FOR AEROBATIC MODELS

By Miles Reed

Understanding airfoils and how they relate to the performance of a model aircraft has as many interpretations as there are people that choose to write about the subject. The following is what I have been able to determine in my venture into the design field. My knowledge of the subject comes not only from research, but by placing my theories into practice. I am sure that some people with an aeronautical background would dispute much of what I am about to say, but I am equally sure that my theory works when applied as described. There are many aerobatic model aircraft designs on the market and most share common characteristics. To simplify this article I am limiting it to one particular monoplane (Extra), and one biplane (Weeks Solution). Both these models are designed strictly for aerobatics and capable of any maneuver one might choose to attempt.

The Extra has a NACA 0015 Airfoil which is a full symmetrical section where the thickest part of the rib is 30% back from the leading edge, and the 15 simply means that the thickness of the rib is 15% of the rib chord (Length.) at the 30% point. This particular 0015 section seems to have the most desirable characteristics and likewise the fewest negatives when applied to monoplanes in the 25% to 40% scale category. Weight is very much a factor in aerobatic performance, and while maintaining structural integrity, the lighter the model's wing loading, the better it performs. Many articles I have read dispute this last statement, but aerobatics are a continuous change of direction, and "Weight in motion tends to stay in motion." Another fallacy as far as I am concerned is the statement that heavy airplanes handle the wind conditions better.

Full symmetrical airfoils are a natural for aerobatics since they present the same airfoil in both positive and negative "G" maneuvers. Let me qualify this by saying that there is some difference in flight characteristics, as a low wing airplane when inverted becomes a high wing airplane. Also any dihedral

in the wing will exhibit the reverse effect when in a negative "G" environment, therefore a good aerobatic design should have little, or nothing by way of dihedral.

The negative of a full symmetrical airfoil is the fact that while the part above the C/L of the rib produces one unit of lift, the part below the rib C/L is producing one unit of drag. This makes it a very inefficient airfoil as far as its ability to handle excessive weight is concerned.

Another factor that comes into play when choosing an aerobatic model is wing plan form. This basically is the root chord, the tip chord, and total span of the wing. Most monoplanes in this category follow roughly a 2 to 1 ratio, example a 20" root chord and a 10" to 12" tip chord. This is commonly referred to as a tapered wing. It is very obvious that this works better in rolling aerobatic maneuvers due to less drag at the tips. Our first trainer with the constant chord wing will attest to this, as attempts at rolling this model were not a sight to behold. Different full scale designs also employ different approaches to wing taper. The Edge 540 employs a straight leading edge the full span of the wing with the trailing edge tapering forward all the way to the tip. The Extra on the other hand, tapers the leading edge back about 1/3 and the trailing edge forward about 2/3. I notice however that most of the models competing in pattern events where scale is not a factor, have a straight trailing edge the entire span, and all of the taper is from the leading edge back. Here again, the designer has a purpose in mind when choosing one particular plan form over another, and I am not in any position to dispute their choice.

Aspect ratio is also important for aerobatic purposes. What is aspect ratio? Lets take the Extra with a 20" root chord and 10" tip chord and 90" span. If we take the 20" X 10" and average it out it equates to 15". We then divide that into the 90" span and it equates to 6. The model would have an aspect ratio of 6 to 1. This is an aspect ratio that is

well into the "Ideal" range for aerobatic aircraft, be it full scale or model. Pylon racers use a lower aspect ratio, while aircraft designed to haul heavy loads use a much higher aspect ratio. Sailplanes take it one step further up the scale, but they do not make ideal aerobatic performers. Fortunately for us modelers, if we hold to the aspect ratio of their full scale counterparts, they have already done the research as to what works best. If we deviate from that, clip wings, or add extra span, in most cases we will get unwanted surprises.

Another bit of terminology that we will explore here is "Reynolds numbers." There are reams of information out there on the subject but simply put, the Reynolds number is a method of rating the efficiency of a wing. Up to a point, the larger the wing, the better the Reynolds numbers become. I doubt that there is a full scale aerobatic aircraft today that has less than a 10 Lb. per Sq. Ft. of wing loading, and they perform every maneuver in perfection. Let's go back to the model described in the above paragraph with the 20" root chord, 10" tip chord, and 90" span. The total sq. in. of this wing would be 1350. Divide that by 144 and you have a model with 9.375 Sq. Ft. of wing area. Apply the 10 Lbs. per sq. ft. that is ideal in full scale and your model would weigh 93-3/4 Lbs. I am sure that you would not consider this an ideal flying weight for your model. Two Lbs. per Sq. Ft. is a more realistic weight for a model of this size. As we go up in size the Reynolds numbers get better, but on an exponential scale. A model with half the wing area of a full scale would not even come close to accepting half the weight.

Wing incidence & stab incidence means simply this: All model blueprints show a thrust line which in cases related to aerobatic aircraft is usually parallel with the fuselage front to back. 0 degrees wing incidence would be where the C/L of the rib would be completely parallel in relation to this line. Stab incidence likewise except in cases where the stab indicates positive incidence. This would have a tendency to cause a "Down" effect in flight. Positive incidence in the wing would have the opposite effect, resulting in more "Up." In most cases, aerobatic aircraft using symmetrical airfoils, both the stab and wing are at 0 degrees, and that is the case with the Extra 260 we are referencing. As to the mounting of the engine in relation to this line, the Extra also is mounted at 0 degrees, meaning no down thrust, no right thrust. There are two separate theories on the necessity of engine thrust, especially right thrust to counteract torque of the engine. One theory is that torque mostly comes into play at a few occasions in the model's flight. One is when a large amount

of control input is added abruptly such as elevator in the corners of a square loop. Unless the proper amount of right rudder is added along with the elevator, performing this maneuver is barely recognizable at best. The other instances that torque comes into play is on takeoff or when the model is flying slowly at a much reduced throttle setting, then suddenly adding full throttle. Again, the way to prevent this is applying the proper amount of right rudder at the proper time. At all other times in a typical flight, (Roughly 99%) torque is very insignificant. There are other factors that will help with the torque problem and it has to do with the proper amount of fuse side area combined with the proper amount of vertical fin, rudder area. The air passing over the fuselage created by the prop does not do so in a straight line, but has a spiral effect. In a properly designed aircraft this spiral airflow strikes the right side of the rear of the fuselage and the vertical fin, rudder combination in such a way that would tend to counter the torque effect. This is referred to as "P" factor, and volumes have been published on how much this effects an aircraft in flight. Again, I will not question someone else's opinion, but will simply state that it works extremely well on the Extra in reference. One more thing that has come to the forefront on my experimenting with models that have the engine mounted at 0 Deg. Vs. the right/down thrust. All else being equal as to weight, drag, and engine size, the model with the engine mounted at 0 Deg. will outperform its counterpart with the thrust added, in any vertical maneuvers asked of it.

C.G. (Center of gravity) simply means that there is a balance point on a model that enables said model to perform to its best capabilities. On most models this falls into a range close to 30% back from the leading edge of the wing chord. On most aerobatic airfoils, this is also close to the thickest part of the rib section. Achieving the correct C.G. is very critical in order to obtain maximum performance from the model. The most commonly used, but most impractical method is to add weight, especially if it requires nose weight. Battery pack location is a great asset in arriving at the proper C.G. I suggest never permanently establishing this location until the very last step before the model is on its first trip to the flying site. If however in the building process, you sense that a tail heavy condition is apparent, balsa selection, lightening holes in stab, fin, rudder, elevator or even a different choice in tail wheel assembly will be of great help. Regardless of whatever it takes, do establish the proper Center of Gravity.

How do I find the proper C.G. on a model when prints or information as to its suggested location is not available? On a constant chord wing it would simply fall 30% back from the leading edge of the wing. On a tapered wing it requires a bit more planning. Start with a point 30% back from the L/E at the wing root. Next go to the tip and establish a point 30% back from the L/E at the tip. Strike a straight line between these two points. We will call this line (A). Next, measure the length of the chord at the wing root. Establish a point using this measurement directly in front of the very tip. Now, measure the tip chord, and place a point using this measurement directly behind the center root rib. Strike a straight line between these two points. We will call this line (B). If you now extend a line outward from the C/L of the fuselage exactly 90 Deg. to the point that (A) and (B) intersect, you will have a 30% C.G. position established. This will work regardless of wing taper configuration, and does the same even on swept wings. If you have a biplane where the wings are staggered, it requires one more step. Strike a line from the intersecting point of (A) and (B) on the top wing, down to the same point on the bottom wing, then measure half the distance of this line. Now the 90 Degree line from the C/L of the fuselage should intersect this half way point, to establish the proper C.G. location. The only wing plan form that this method will not work is on an elliptical wing such as the Spitfire, or the Cap 20L.

FOR SALE

Bryan Walford has a G-Mark 30 5-cylinder engine, 1980 vintage, that he is wishing to get without.

He writes"

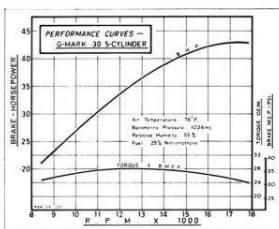
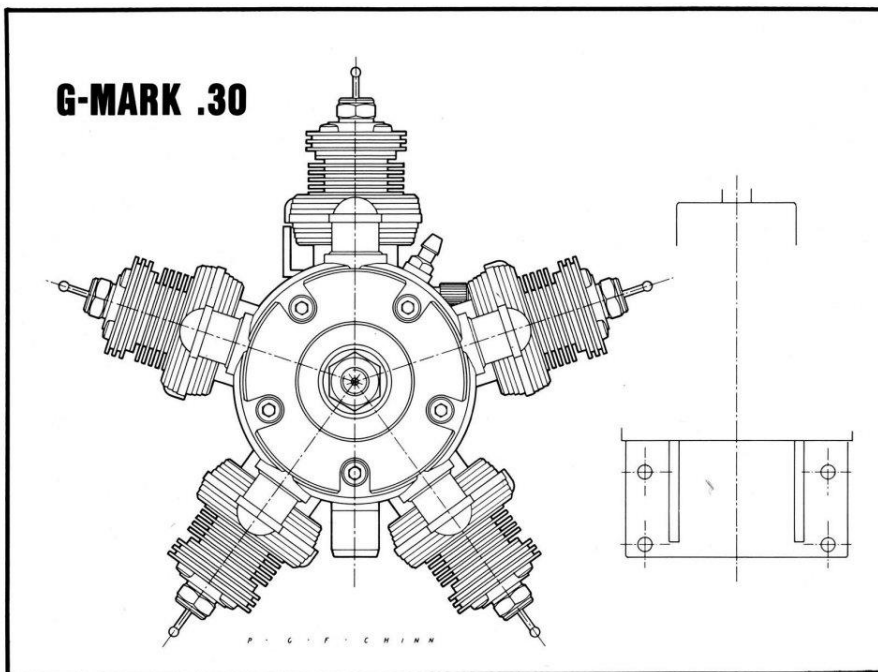
I have that G-Mark.30 5-cylinder radial motor to sell with the proviso that it goes to a club member so that I get to see the model using it. Alternatively, I can donate the motor to a joint project."



So if anyone has plans for a vintage scale radial model get in touch with him. It's a beautiful piece of engineering.

ENGINE REVIEW

by Peter Chinn



SPECIFICATIONS

Type: Five-cylinder, crankcase-charged, two-stroke cycle, radial engine with five twin-ball-bearing crankshafts geared 1:1

to central drive shaft, supported in three ball bearings. Throttle type carburetor with rear rotary drum valve distributing mixture to individual crank chambers.

Checked Weights: 359 grams (12.7 oz), as supplied, less glowplugs; 375 grams (13.2 oz) when fitted with Glo-Bee 3-L glowplugs.

Displacement: 5.000cc (0.3051 cu in.)

Bore: 11.20 mm (0.4409 in.)

Stroke: 10.15 mm (0.3996 in.)

Stroke/Bore Ratio: 0.906:1

Measured Compression Ratio: 6.0:1

Specific Output (as tested): 1.41 bhp/cu in.

Power/Weight Ratio (as tested): 0.52 bhp/lb

Manufacturer: G-Mark Inc., Tokyo 101, Japan.

U.S. Distributor: Cannon Electronics Inc., 13400 Saticoy Street, North Hollywood, CA 91605.

• This year has been quite an eventful one as far as the "Engine Review" test series is concerned. It has seen the publication of our first full test reports on a twin-cylinder four-cycle engine (the O.S. FT-120 Gemini), on the first RC aircraft engine with a built-in reduction gear (the Webra 61-RCG), and now on the first five-cylinder two-cycle motor to be offered to modelers, the G-Mark .30 radial engine.

As we remarked in our preliminary notes on the G-Mark .30 in the May "Foreign News" column, production model radial engines are rare but not entirely unknown. Currently, there are Technopower's Hargrave-designed five and seven cylinder radials and, of course, it was the American Morton M-5 which, back in 1945, led the way with scale type radials. Both these designs, however, are

COMING EVENTS

Issue 146 of the AVA (vintage) newsletter can be downloaded from the MFNZ website. Note the international postal ½ A Texaco event this month

September	NDC 1/2A Texaco
	18 - 19 Airsail MAC Vintage
October	23 - 24 Tuakau MAC Vintage
November	20 - 21 Thames Blackfeet Vintage
	20 Scale at Matamata
February	12 scale at Matamata
	26 - 27 Airsail MAC Vintage
March	19 - 20 Awatoto (TBC) Vintage
April	9 - 10 Thames Black feet Vintage
	21 Scale at Matamata
May	21 - 22 Tuakau MAC Vintage

CLUB FUEL

METHANOL \$2.50 PER LITRE (OWN CONTAINER)

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70% METHANOL, 20% COOLPOWER, 10% NITRO

\$40.00 [US GALLON

\$10.00 per LITRE

FUEL WITHOUT NITRO

82% METHANOL, 18% COOLPOWER oil

\$? US GALLON

\$? PER LITRE

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ALL PROFIT GOES TO THE CLUB

PLEASE BRING YOUR OWN CONTAINER

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