Committee - George Whelan 208617, Derek Robertson 821368, Neil Davidson 712458

JUNE 2000 NEWSLETTER

Well here we are almost half way through the year; you wonder where the time has gone. I don't believe from an ADS point of view that it has been a very auspicious year to date. The pub nights at the Cove bay hotel were reasonably well attended and I think we should look to continue the format over the winter months and try and organise a variety of activities for the members, start thinking about it now. The Saturday slope flying was a limited success; the first one in January was blown out by high winds. The other 2 days in February and March were good days at Barmekin, again the attendance was nothing to write home about, approximately 7 people on each occasion. Finally the slope day on May 7th was poorly attended with just three members, the day on the Cairn 'O' Mount was brick lifting and very warm and sunny. Meantime the Saturday thermal flying at Calder park has been miserably attended, if no body is turning up why vote for the changes in the first place. I think the current attendance record seriously jeopardises our credibility to hold the club competition on 3rd & 4th June.

The current position with Calder Park is that the proposed developers have been asked for additional information by Aberdeen Council and the proposal will be presented again to the planning committee on 2nd of June. If it is successful it will go before the Scottish Office.

ADS have been given the use of some land at Raitshill farm at Udny Green. With a view to keeping the maximum number of options open we propose to use this as a Sunday flying venue. An area of grass has been cut for our use but the adjacent rectangular field may be more suited to our needs. The owner Bob Rothnie is very sympathetic to model flying having stirred the sticks himself in the past. We will persist with our efforts to get a move to Hazelhead Park meantime. - Site map

Couple of interesting articles this issue.

a) A novel method of making glass fuselages, looks fairly simple to me, go easy on the epoxy resin.
b) For those of you with an electronic bent a simple model finder.
c) This issue plan is a simple HLG. I am sure you can scale up the plan to full size.
d) Another article from Stan Yoe's website, a simple guide to how radio control works.

We have been asked if we want to partake in an engineering exhibition at the Exhibition Centre on 18th-19th November. I understand we can have a couple of tables and also hang up some models from the sky.

Some dates for your calendar:-

3rd - 4th June	Club comp and fly-in at Hazlehead Park.
10th-11th June	Back up date for fly-in and comp.
24th-25th June	Slope soaring nationals. Bishop Hill. Kinross, Fife.
2nd July	F3J Mossmorran.
9th July	100S Mossmorran
16th July	BARCS Open Glen Craig
23rd July	Thermal & slope Fly in. Fairlie.
30th July	Barbercue & fun-fly Calder Park.

RollFuz - Single Seam Rolled Fuselages

I have been using rolled glass fuselage booms since 1975. This method may be used for tail booms or in the case of my Prospector design the boom is continued forward to the wing leading edge. A sandwich of two layers of acetate film, with suitable glass layers in between is rolled around a tapered mylar mandrel, which has former at the front and a circular section at the tail. The following drawings should give an idea how the method works.

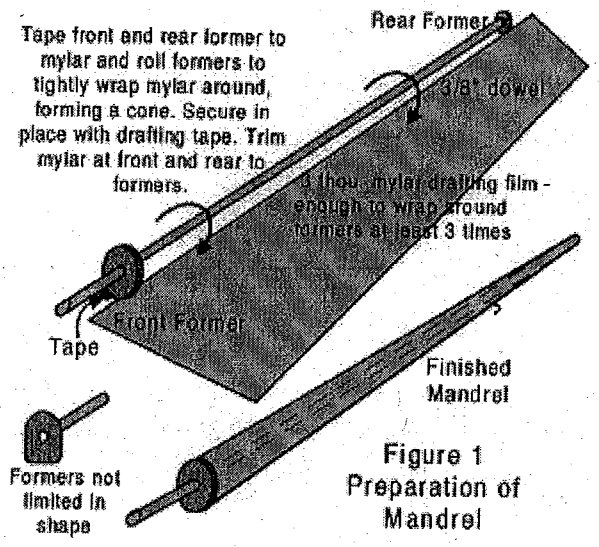


Figure 1
Preparation of Mandrel

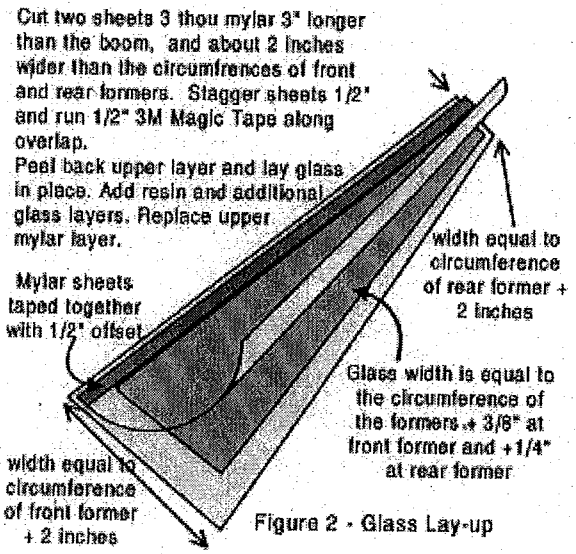


Figure 2 - Glass Lay-up

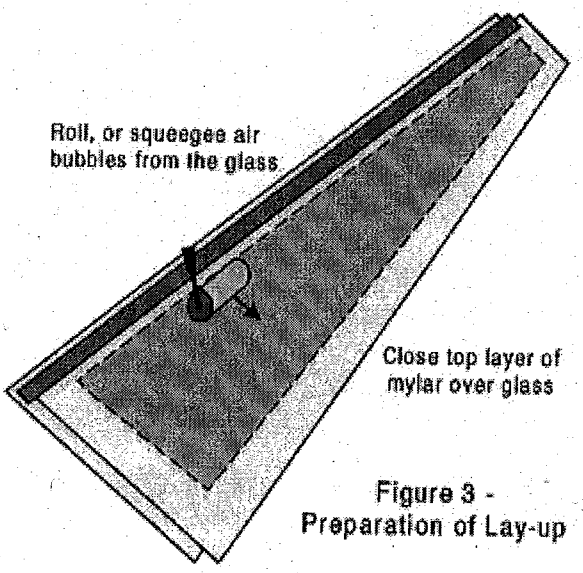


Figure 3 -
Preparation of Lay-up

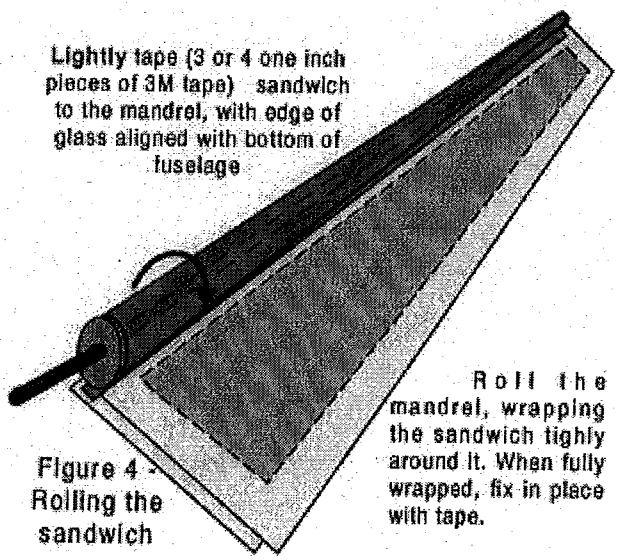
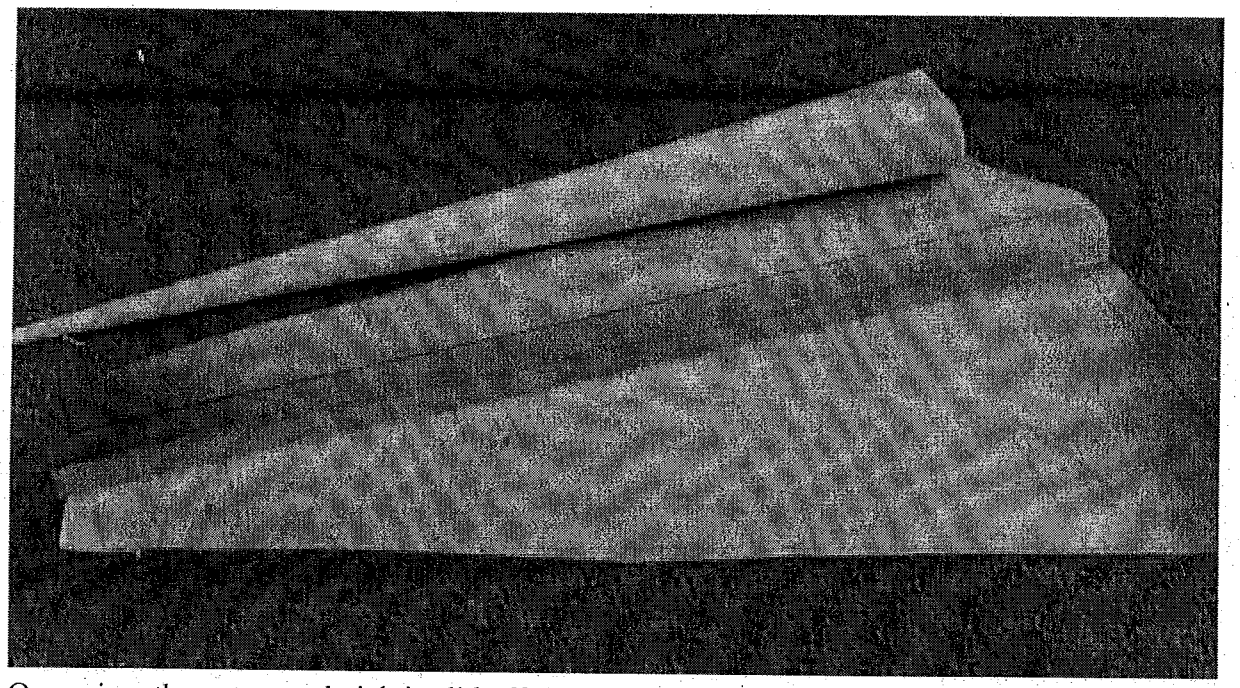
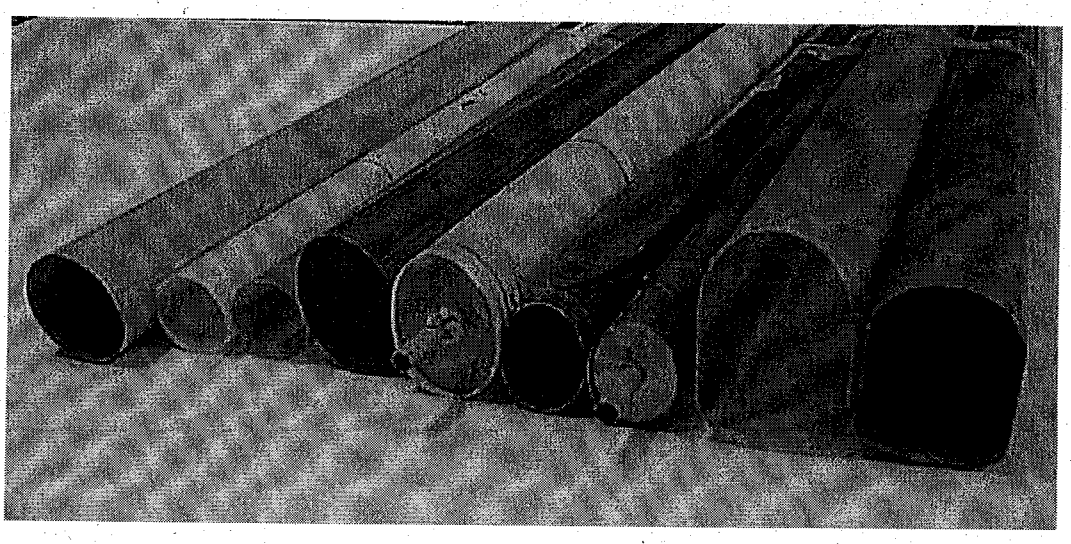


Figure 4 -
Rolling the sandwich



On curing, the outer sandwich is slid off the mylar tube. The acetate layers are now both inside and outside the glass tube and have to be removed. The resulting glass boom has a single opening with a 3/8" overlap which is glued with CA. Instead of acetate film, mylar may be used, but I find the finish using acetate is far superior. This system has been used on everything from 1/2A pylon racers to 15 foot cross country Thermal soarers. This method is equally applicable to rolling 1/2" diam. ballast tubes. I have never seen anyone else use this method.

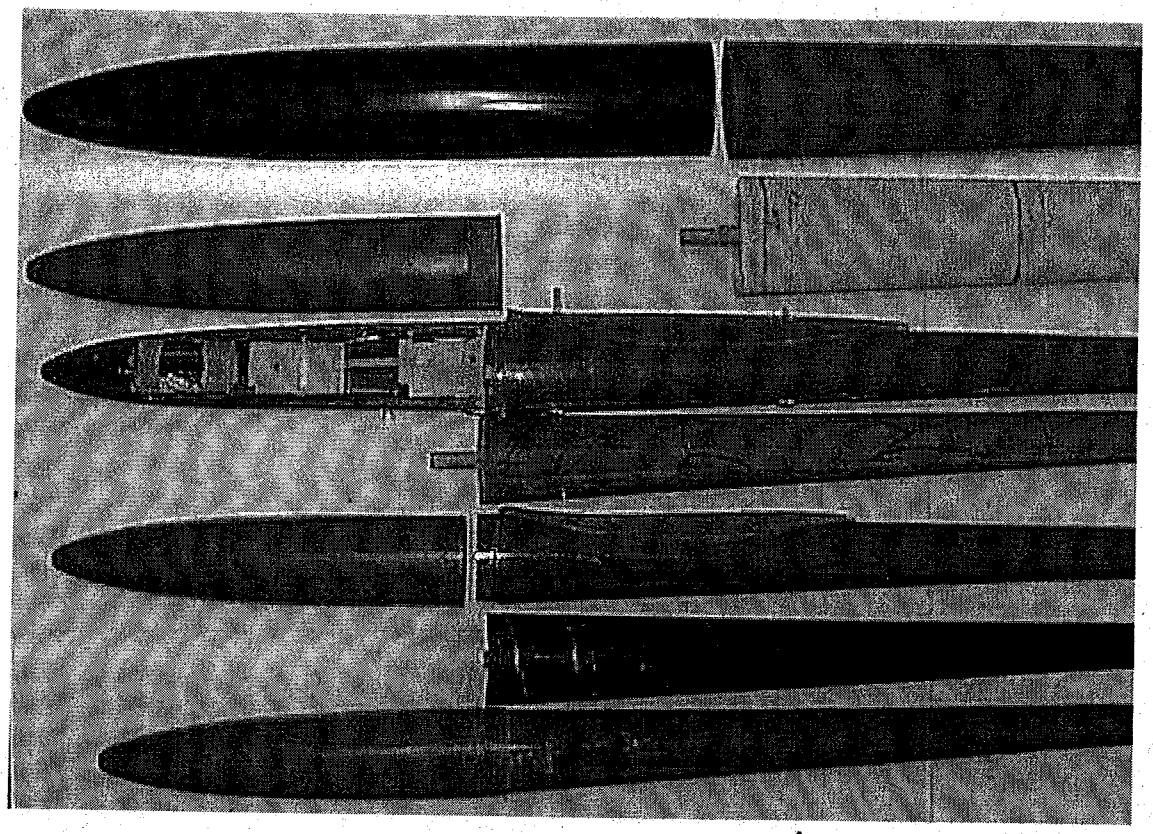
The acetate I use is 3 thou clear in a 36" roll which was purchased from a drafting supply company. Regular drafting mylar works just as well, but is expensive to purchase. If you know anyone in the drafting game, I'm sure you can get off-cuts for free. Even 6" wide strips will do a fuselage 1.75" diameter. Old discarded drawings will work too. The mat finish on the mylar will wash off with acetone giving a clear glossy surface, but this is not really necessary if the fuselage is to be painted. The acetate sheet does not need any release wax is the resin will not adhere to it. Most of the mylar I have used will also separate without waxing, but occasionally I get some that will not release. Do some tests before using it. I normally use coloured pigment in the glass layup and the boom does not need painting except for a little touch up on the seam. The finish is usually better than I can achieve by painting anyway."



From left:

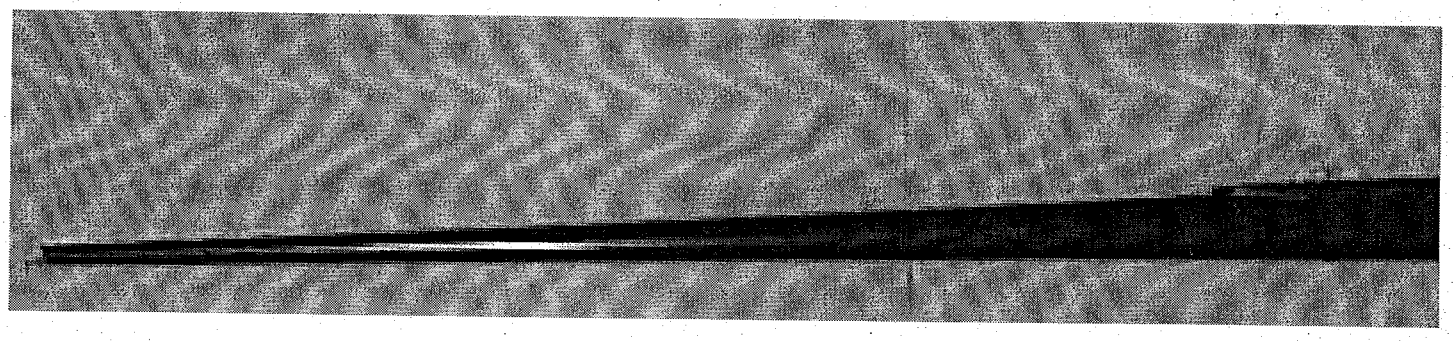
1. Tail boom of 15 foot Overlander XC model circa 1985

2 and 3. Mandrel and boom Spinifex 100 (ply fuselage Spinifex 100 plans Sept 86 RC Modeler)
4 and 5. Fuselage boom and mandrel for 3M Prospector
5 and 7. Fuselage boom and mandrel 2 metre Prospector
The two on right are flat bottomed, rounded top FG mandrels from my earlier Spinifex versions. Just to show that the system works with different shape formers.



From Top to Bottom
Plug and fuselage boom and mandrel of 3 metre Prospector
Fuselage and mandrel of 2 metre Prospector. Note old geology map mylar.
Wing bolts go through fuselage to blind nuts in wing.
Fuselage and mandrel 60" slope racer
Fuselage 60" HLG weight 35 gm

Prospector Series Fibreglass Fuselages

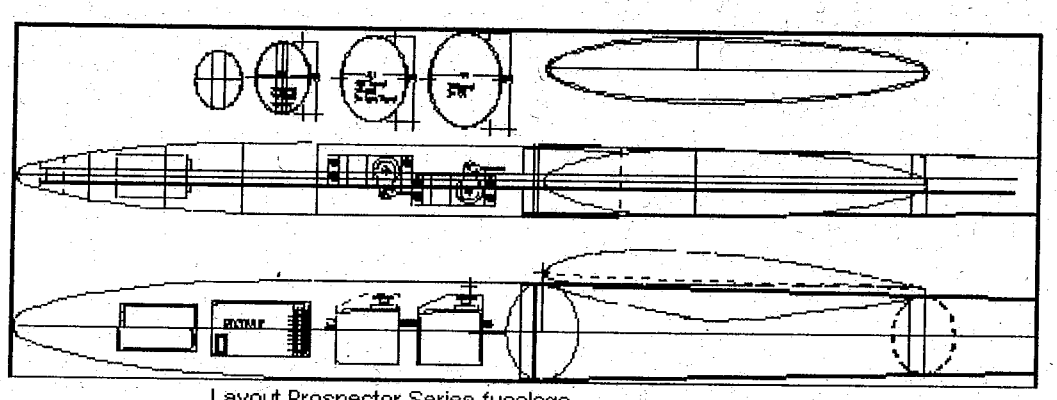


These fuselages use a unique rolled single seam fibreglass/ kevlar boom (Rollfuz Method), with a low pylon mounted wing.

There is a choice of front end;
a) Vertical crutch of balsa skinned with carbon and glass, with nose cone.
b) Moulded front end to slide into the boom, with a nose cone
conventional or V tails

Available in the following sizes

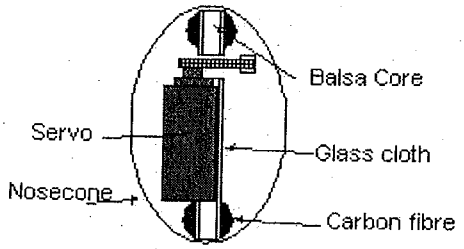
Model	Height	Width	Length
1.5 metre HLG	1.65 " (+1/8" for pylon)	1.25"	36 "
1.5 metre Slope	2.0" (+1/8" for pylon)	1.4"	36"
2 metre Thermal	2.0" (+1/8" for pylon)	1.4"	43.3"
100" Thermal or slope	2.25" (+3/16" for pylon)	1.7"	50"
3 metre (TD, F3b, F3F)	2.5" (+3/16 for pylon)	1.875"	56"



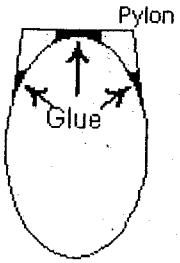
Layout Prospector Series fuselage

At present Pylons are moulded with flat tops. (Fairings to wing section done by builder). If warranted I will prepare pylons for a small number of the more popular sections. Currently the chord of pylons are 10" (3M), 8.5" (2M) and 7.5" for HLG and 60" slope. They can still be used with slightly larger or smaller chord wings.

Prospector

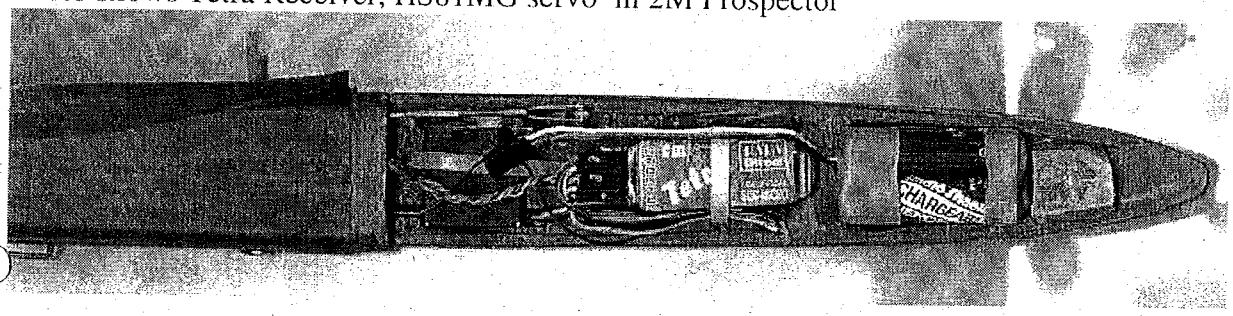


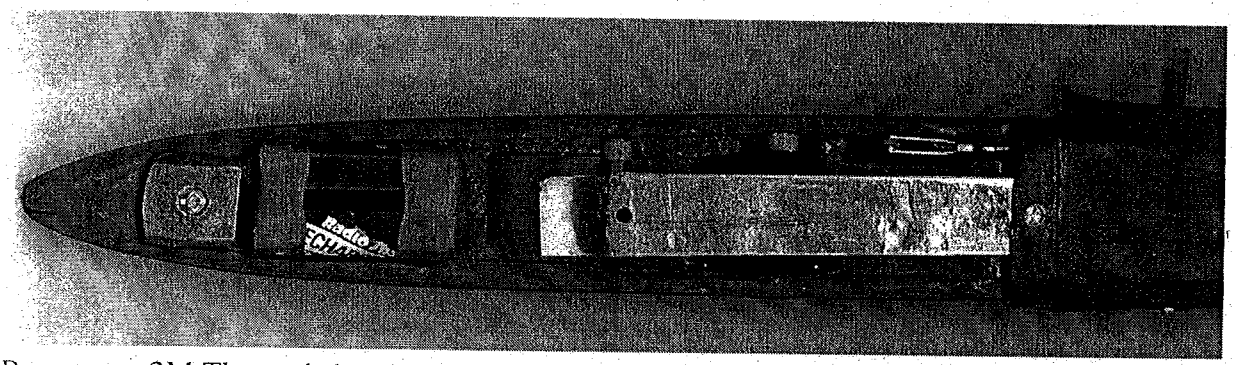
Section through fuselage at servo



Section through fuselage at pylon

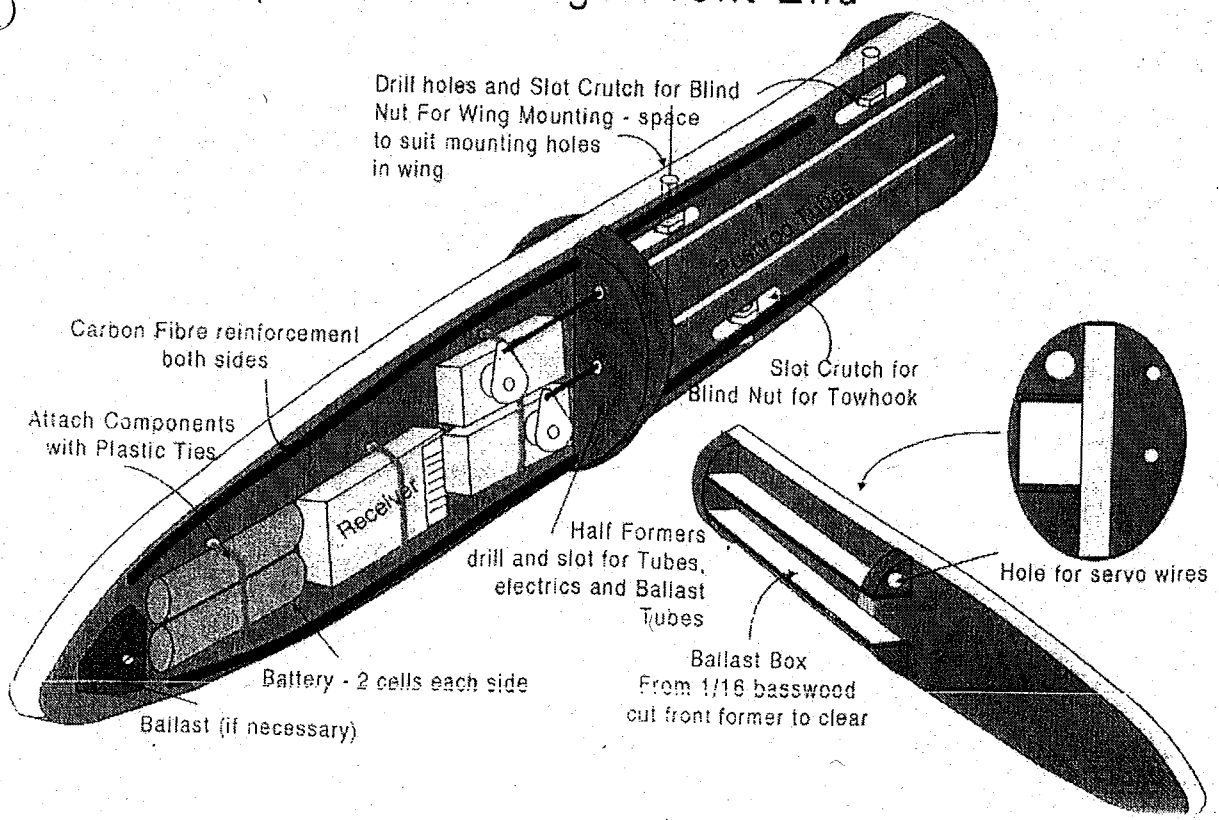
Photo shows Tetra Receiver, HS81MG servo in 2M Prospector





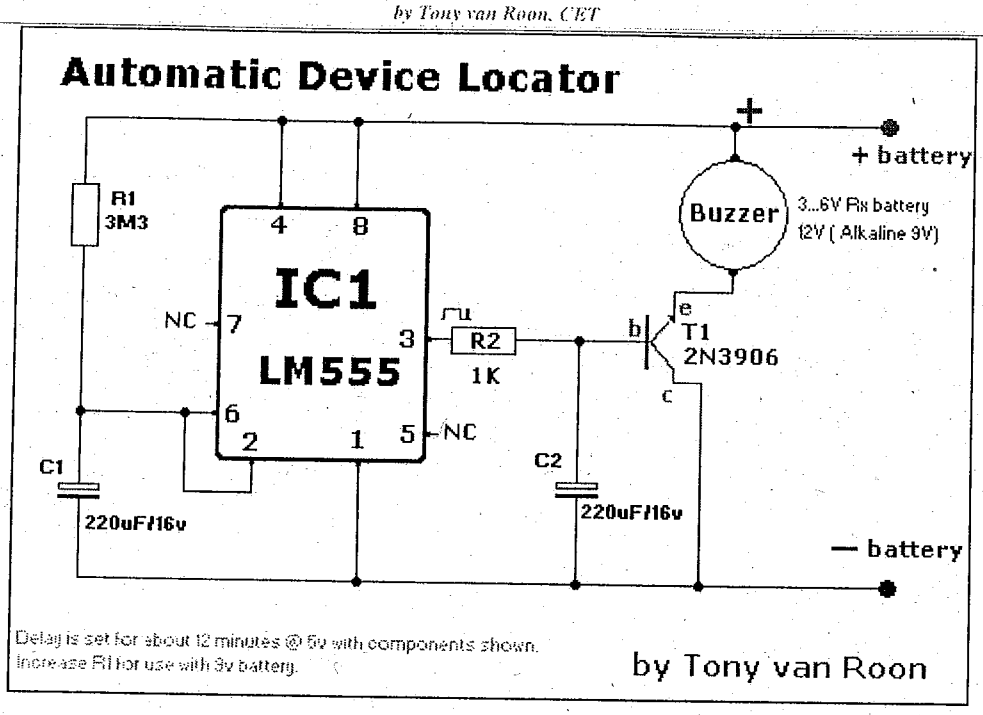
Prospector 2M Thermal showing 3/4"x 3/16"x 8" lead ballast being inserted in fuselage. 1/8" diam dowel through hole in fuselage and ballast acts as locking pin. Hi-Tech HS81MG servos. Servo and receiver positions and ballast boxes can be adjusted to suit individuals requirements.

Prospector Fuselage Front End



Automatic Device Locator

by Tony van Roon, CET



Parts List:

R1 = (3M3) *see text
IC1 = LM555/NE555
R2 = 1K
T1 = 2N3906
C1 = 220uF/16V Buzzer 3v (using Rx) or
C2 = 220uF/16V or 12v using 9V

A Couple of Final Notes:

o With this circuit you can find your aircraft easily in high grass, corn fields, soybeans or whatever. As soon as you power on you receiver the timer will start to count down.

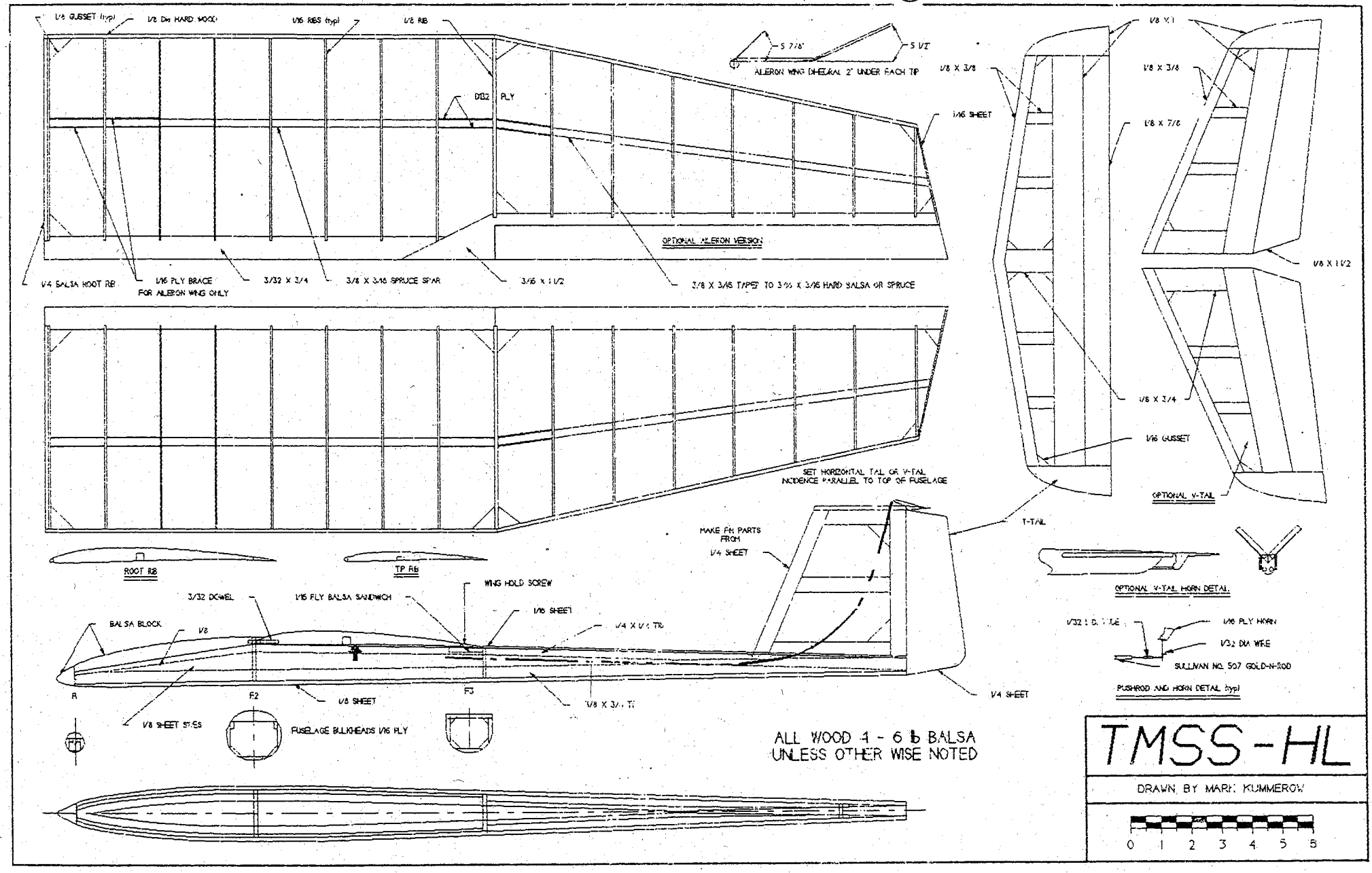
o If you power the unit via the receiver battery, make sure to purchase a 3 - 6 volt buzzer! Remember that in the case of a crash (heaven forbid!) the receiver may loose its power from the battery pack because of the force of impact. It would be safer to provide the ADL with a 9-volt Alkaline battery + on/off switch and wrap the whole thing in 1/4" SIG latex rubber.

o The timer, with the components shown above, goes off in about 18 minutes @ 9-volt. To increase the delay, increase the value of *R1*. Also, R1 could be made adjustable with a 5-Mega Ohm trimpot of the proper wattage.

o A CMOS version of the **555** timer is available (**MC1455P1**), and preferred, which will cut the powerdrain on battery powered circuits. The MC1455P1 is pin-compatible with the NE555, and most other 555 chips. C1 and C2 are electrolytic capacitors so watch the '+' and-" orientation. T1 (2N3906) can be most any substitute so it's not critical; just watch the position of the emitter/collector as some european type have them reversed (like the BC types).

o The ADL can be used for all forms of R/C equipment, the only thing needed may be to adjust the delay to tailor your needs.

o This device is tested for interference with JR, Futaba, HiTec, Airtronics, and ACE radio equipment. None were found and none are expected when used with other brands of Radio equipment.


1/8 GUSSET (typ)
1/8 Dia HARD WOOD
1/16 RIBS (typ)
1/8 RIB
D132 PLY
5 7/8"
5 1/2"
AILERON WING DIHEDRAL 2" UNDER EACH TIP
OPTIONAL AILERON VERSION
1/4 BALSA ROOT RIB
1/16 PLY BRACE FOR AILERON WING ONLY
3/32 X 3/4
3/8 X 3/16 SPRUCE SPAR
3/16 X 1 1/2
3/8 X 3/8 TAPER TO 3/16 X 3/16 HARD BALSA OR SPRUCE
SET HORIZONTAL TAIL OR V-TAIL INCIDENCE PARALLEL TO TOP OF FUSELAGE
ROOT RIB
TIP RIB
MAKE FIN PARTS FROM 1/4 SHEET
WING HOLD SCREW
3/32 DOWEL
1/16 PLY BALSA SANDWICH
1/16 SHEET
BALSA BLOCK
1/8
1/4 X 1/4 TE
F1
F2
F3
1/8 SHEET
1/8 X 3/4 TE
1/8 SHEET STOCK
FUSELAGE BULKHEADS 1/16 PLY
1/4 SHEET
1/8 X 1
1/8 X 3/8
1/8 X 7/8
1/8 X 1 1/2
1/16 SHEET
1/8 X 3/4
1/16 GUSSET
OPTIONAL V-TAIL
T-TAIL
OPTIONAL V-TAIL HORN DETAIL
1/32 I.D. TUBE
1/16 PLY HORN
1/32 DIA WIRE
SULLIVAN NO. 507 GOLD-N-ROD
PUSHROD AND HORN DETAIL (typ)
ALL WOOD 4 - 6 lb BALSA
UNLESS OTHER WISE NOTED
TMSS-HL
DRAWN BY MARK KUMMEROW
0 1 2 3 4 5 6

Radio Controlled Systems

By Stan Yeo

Often when talking to modellers it becomes apparent that a surprising number do not understand the basics of a radio control system, how it works or what is compatible with what. Whilst I readily accept that this is not essential to the enjoyment of the hobby a lack of knowledge can and does restrict the modeller when buying supplementary airborne equipment. Fortunately though this lack of knowledge means the modeller errs on the safe side when making these purchases. The purpose of this article is to explain in simple terms the basics of our current radio control systems and the meaning of some of the most common buzzwords.

The System

As we all know the system comprises of a transmitter, which encodes and transmits the control information. A receiver which receives the transmitted signal, decodes it and allocates the information to the respective servos and the servos which move the control surface (throttle) to the desired position.

1. The Transmitter

The main modules to the transmitter (Tx) are the Encoder and the Radio Frequency module (RF section) which includes a Power Amplifier (PA) and a 'Mixer'.

The Encoder

The Encoder takes the position of each channel control stick or switch in turn and converts it into 'digital' information. This can be a pulse of a certain length (time) (PPM) or a binary number (PCM). It does this approximately 50 times a second (50Hz). So that the receiver (Rx) knows when one cycle of information is complete and another cycle starts the Encoder inserts a synchronisation pulse which 2 to 3 times longer than a normal pulse between each sequence of pulses (PPM). PCM uses a different system that varies between manufacturers.

The RF Section

The purpose of the RF section is to transmit the encoded information to the receiver but to do this it must first generate a radio signal at the correct frequency and mix it with the encoded information from the Encoder. It must then amplify the signal so it is strong enough to reach the Rx. Consequently the RF section has three sections, a Crystal Oscillator to produce a signal at the desired frequency. A Mixer to mix it with the signal from the Encoder and a PA (Power Amplifier) to increase the signal strength to the desired level for transmission.

2. The Receiver

Like the transmitter the receiver has a number of sections and is almost the mirror image of the Tx. There is a RF section sometimes known as the 'Front End' to receive the incoming signal from the Tx, a Crystal Oscillator, a Mixer, an IF (Intermediate Frequency) Strip, a detector and a decoder. The RF section is tuned to receive the signal from the Tx whilst the Crystal Oscillator (local oscillator) produces a similar signal but at a lower frequency (455Khz lower), to be mixed with the incoming Tx signal. The difference in frequency between the two signals is then passed to the IF Strip. The IF Strip is a filter which will only allow signals of the IF frequency to pass through it. With single conversion PPM receivers this frequency is 455 kHz which is the difference between transmitted signal frequency and the local oscillator frequency assuming of course that both are operating on the same channel number! After the IF Strip the signal is then rectified i.e. converted to a DC signal similar to that of the Encoder and passed to the Decoder. The Decoders job is that of a postman's i.e. to post each piece of channel information to the correct output channel socket for onward dispatch to the servos. It must do this 100% accurately every time and irrespective of the number of channels the Tx or Rx has such that an 8 channel Rx will work with a 4 channel Tx and vice versa etc. It is aided in this by the synchronisation pulse inserted by the Encoder that tells the Rx when one chain of information is complete and another is about to start. The effect of this pulse is to tell the Decoder counter to stop counting and go back to zero again.

System Variations

Transmitter

There are two types of transmitter, one involves pulsing the transmitter (AM) i.e. switching the output on and off a bit like Morse code whilst the other involves 'swinging' the Tx frequency (FM). AM refers to Amplitude Modulation whilst FM stands for Frequency Modulation. Most r/c equipment on the 27Mhz band is AM whilst all current 35Mhz sets are FM. A FM receiver is different from an AM receiver and

neither will work with the others transmitter. AM transmitters are all PPM (Pulse Proportional Modulation). PCM (Pulse Coded Modulation) transmitters are generally switchable between PPM and PCM modes.

Receivers

There are four main types of receiver, AM - PPM for 27Mhz equipment, FM PPM Single Conversion, FM PPM Dual Conversion and PCM which can be either single or dual conversion. Needless to say with so many options and so many different makes there is the inevitable confusion, most of which seems to centre around the dual and single conversion PPM system. Most modellers accept that an AM Rx will only work with an AM Tx, likewise it is accepted that to drive a PCM Rx you need a PCM transmitter of the SAME make as the receiver. The reason for this is that with PCM there is not as yet a common encoding standard as there is with PPM. A bit like the British and American television standards which are incompatible.

The main difference between a single conversion receiver and dual conversion receiver is the dual conversion receiver has two crystals whilst the single conversion receiver has only one. Theoretically a problem can arise with a single conversion Rx if there is another transmitter operating on a frequency which is a harmonic away from the IF frequency of that receiver. A harmonic of the IF frequency would be 910Khz (2 x 455) or 227.5Khz (455 / 2). Now 227.5Khz is almost the difference in frequency between Channel 60 and Channel 83 which we know to be 230Khz (23 x 10Khz). The same would apply to channels 61 and 84 (either way), 62/85 and 63/86.

In a dual conversion receiver there are two crystals, the one we change to change channels and a fixed crystal. The idea is that by reducing the frequency of the incoming signal down to the IF frequency in two stages we can increase receiver selectivity and overcome the theoretical problem associated with single conversion Rxs mentioned above. The first crystal (the one we plug in) produces a signal between 24 and 25Mhz whilst second produces a 10.7Mhz signal to be mixed with the difference of the incoming signal and the first oscillator signal i.e. 35Mhz - (24-35Mhz). The difference in these two signals (455 or 470Khz) is then fed to the IF strip as before. Because Dual Conversion receivers are more complicated than single conversion receiver they are more expensive. Also as a rule Dual Conversion Rxs need to be fitted with crystals of the same make as the Rx which is not always the case with single conversion Rxs.

The Myths

The main myth is that you can only operate Dual Conversion receivers from a 'Dual Conversion' Tx and a Rx similar to the one that came with the set. This is simply not true. There is no difference between a PPM Tx that came with a Dual Conversion Rx and one that came with a Single Conversion Rx. Often a retailer will swap a dual conversion Rx for a single conversion Rx to reduce the total cost of the set. A point worth checking when you see a set advertised at less than you would expect it to be!

Another misapprehension a lot of modellers are under is that different brands of PPM Rxs will not work with other brands of Tx. In fact there are a number of receivers on the market that do not have accompanying transmitters Webra and Jeti are two that come to mind. Likewise all the leading brands of servos will work with all the leading brands of R/C equipment providing they have the appropriate leads. I personally use a JR388 transmitter with mainly Hitec airborne equipment. With some single conversion Rxs there is even some compatibility with different makes of crystals i.e. Futaba Hitec and JR. If mixing and matching I would strongly advise a full range / compatibility check before flying. Range checks should be carried out in a controlled manner i.e. a comparison made between a receiver known to be operating as expected and the new one.

Summary

I hope this article has been of value and more importantly easy to understand. I have kept the explanations as simple as possible as we do not need to know how it works just the basic concepts so we can make informed decisions when buying new equipment.