



# Sydney Radio Control Society

June 2007

# Newsletter

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## Quarterly General Meeting

**To be held at the field on Saturday 16<sup>th</sup> June at 11.00am followed by a BBQ lunch.**

### **Agenda:**

- **Apologies**
- **Previous Minutes**
- **Matters Arising**
- **President's Report**
- **Treasurer's Report**
- **Secretary's Report**
- **Other Business**





# SYDNEY RADIO CONTROL SOCIETY CLUB NEWSLETTER

## THE 2006 – 2007 COMMITTEE

<b>NAME</b>	<b>POSITION</b>	<b>PHONE</b>	<b>E-MAIL ADDRESS</b>
Mike Close	President	(02) 9872 6469	mikeclose@cherry.com.au
Matt Holloway	Vice President	(02) 9670 1164 0412 522 050	mholloway@mmm.com
Rex Broadbent	Secretary	(02) 9686 3114 0417 471 361	rexp@optusnet.com.au
Ewald Klinkenberg	Treasurer & Registrar	(02) 98312817	klink07@bigpond.com
Stephen Liseo	Newsletter Editor	0418 456 114	liseos@hillsgrammar.nsw.edu.au
Baldo Polizzi	Ordinary Member	(02) 9630 4019 0418 479971	balmap5@bigpond.com
Corinne Pellatt	Ordinary Member		corinnepellatt@yahoo.com.au

<b><u>CLUB EVENTS</u></b>	<b><u>Date</u></b>	
Quarterly General Meeting	Saturday 16 <sup>th</sup> June	
Hog Day	Sunday 17 <sup>th</sup> June	
Kevin Grey Fun Fly	Saturday 11 <sup>th</sup> August	
Scale Rally	Sunday 21 <sup>st</sup> October	
A reminder that there is no general flying when club events are held		

	<p>These items can be purchased from the Club Treasurer</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Club metal badges</td> <td style="text-align: right;">\$5 ea.</td> </tr> <tr> <td>Club cloth badges</td> <td style="text-align: right;">\$5 ea.</td> </tr> <tr> <td>SRCS stickers</td> <td style="text-align: right;">50c ea</td> </tr> <tr> <td>Club tee shirt</td> <td style="text-align: right;">\$25 ea</td> </tr> <tr> <td>Club caps</td> <td style="text-align: right;">\$15 ea.</td> </tr> </table>	Club metal badges	\$5 ea.	Club cloth badges	\$5 ea.	SRCS stickers	50c ea	Club tee shirt	\$25 ea	Club caps	\$15 ea.	
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SRCS stickers	50c ea											
Club tee shirt	\$25 ea											
Club caps	\$15 ea.											
<p>At the moment the Club has plenty of stock of caps and shirts available, so why not lash out and invest in a new Club shirt and cap. Don't forget that the Club badges issued to this years financial members must be worn at all times. A perfect place to wear it is on your new cap.</p> <p style="text-align: center;">These items are available from <b>Ewald Klinkenberg</b> at the field.</p> <p style="text-align: center;">Sizes for the shirts are small, large and extra large in blue or grey.</p>												

## **PRESIDENT'S LETTER**

Doesn't time fly? We are now nearing the end of the financial year and at the next QGM we will be setting the fees for next year. I am sure that most of you know two elements of the fees are outside our control. The MASNSW and MAAA fees are set by those organisations. The club fees have remained unchanged now for many years, which is good of course, but it is up to you, the members, to decide what you want to do for 2007/8. If you are not at the meeting then you have no say in what happens.

As sometimes happens there are a few things that need to be mentioned regarding safety and good practice. Whilst the club has a Safety Officer it is not his role to be the exclusive safety person in the club. One of the main reasons for the role is that MASNSW require that there is a person who is responsible for the investigation if we were to have a serious safety incident. Obviously we intend that this never happens and for this reason everyone in the club is considered to be a safety officer. At times we all forget to do something and having someone politely point it out contributes to the ongoing safety of us all. I am sure that the committee would always support any club member who raised some legitimate concern if there ever became an argument over it.

A few weeks ago an aircraft, which had flown before, crashed after going out of control almost immediately after it took off. Some observers said that the elevator was detached before it left the ground. When the remains were examined four of the five control surfaces were either off or a simple light pull released them. As part of the instruction scheme the MAAA strongly advocates that models are checked before the first flight every day. If it had been done on this aircraft it would have revealed the problem and whilst the aircraft might have had to be taken home for fixing, it would have been in one piece. Don't forget as well, that an out of control aircraft can be very dangerous to everything, and everyone, around. Elsewhere in the Newsletter you will find a suggested check list which you can cut out if you like, or just ask me for a clean copy which you can laminate and use.

It is essential that all visitors are signed in every day before they fly. This seems to be generally happening and it lets us see who is flying and also enables us to return any left behind transmitters, yes it does happen, or contact them if there has been an incident whether involving them or anyone else. What may not be realised is that this is absolutely critical for people who are not current Affiliate Members of the MAAA. Many of you are probably not aware that the MAAA insurance policy does not cover its members if they are flying at an organised activity, and this includes club activities, if there are non members flying, unless they have been signed in as required by the MAAA Visitors Policy. Whilst it might or not be applied if there were an incident, technically no one is covered by the MAAA Insurance policy as soon as there is an indication that a non MAAA member present at the field is ready to fly or has been flying until they leave, unless they have been signed in. This is obviously potentially very serious for everyone there. The location of the MAAA Manual of Procedures on the web is always in the MAAA Newsletter and it would be worth everyone having the occasional look at the contents.

Having said all this there is a very strong safety culture in the club and we get very favourable comments from both visitors and the club members who see how other clubs fly. As an aside the Companies bidding for the MAAA insurance business this year have expressed strong support for the safety practices that the MAAA advocates. Well done to you all - keep it up.

I hope to see you all at the QGM and happy and safe flying.

Mike Close  
**President**



**It's on Again!**



Sydney Radio Control Society

# **HOG DAY**

Bring along your best (or worst) Hog  
for the premier RC event of the year

**Sunday 17th June Gates Open at 8:30**



Don't Have a HOG?  
Come along anyway and support your club

BBQ and refreshments available

Didn't get to the Red Bull Air Race  
Then how about the Pink Hog Air Race instead

**Minutes of Quarterly General Meeting 24th February 2007**

**Held at the airfield, starting at 11.12am.**

**Present:** Col Bacon, David Bacon, Rick Rapley, Mike Close, Michael Murdaca, Noel Dalton, John Howard, Ewald Klinkenberg, Derek Slevin, Phil Norris, Rex Broadbent, Bob Evans, Col Lyttle, Ross Hill. Steve Liseo, Renton Wright, Paul Toyne, Ruben Cipriotto, Ralph de Veer, Corrine Pellatt, Benjamin Burrell, Denys Fowke.

**Apologies:** John Cahill, Matt Holloway, Baldo Polizzi, Robert Zyp, Col Bruce, Phil Chapman.

**Guests:** Andrew Vivero, Carlos Vivero.

**Chair:** Mike Close

**Attendances and apologies** were tabled.

**Minutes of previous meeting -18 November 2006:** Taken as read.

(Ruben Cipriotto was added to attendances).

Acceptance proposed by Derek Slevin; seconded by John Howard. The motion was passed

**Matters arising:**

1. Keyboard. Work has been done - still to be finalized. Not urgent until 2.4 Ghz becomes operational. Mike Close.

**Treasurer's Report:**

The profit and loss account and balance sheet for the period July 2006 to February 2007 (up to the date of the QGM), with the comparative figures for the same period last year, were tabled.

Acceptance proposed by Ewald Klinkenberg; seconded by Derek Slevin. The motion was passed

**Secretary's Report:**

Correspondence had been received from Roadmaster that SRCS was charging fees for its members to fly -if so: Roadmaster felt unhappy about their sub-lease to SRCS being at no cost. Mike Close has spoken to the chairman of Roadmaster - who is now satisfied that SRCS does no more than recover necessary costs from members.

Roadmaster did say that they intend to want to use the portion of land now being used by SRCS - "in 3 to 5 years".

**General Business:**

1. Phil Norris: Instructors courses being off site discourages members from being instructors. Decision: Mike Close will investigate the feasibility of running instructor courses at the SRCS field.
2. Helicopters operating in the runway area. Pilots who are proficient with helicopters can take off from the runway area, but must immediately fly away from the runway to the general flying area.
3. Another windsock on the flying side of the runway?: not feasible, as would be an another obstacle to create possible crashes. Better to have a ribbon tied to one's radio aerial to judge when wind changes.

The meeting closed at 11.40am. Minutes recorded by Rex Broadbent.

# SYDNEY RADIO CONTROL SOCIETY CLUB NEWSLETTER

## Treasurers Report Balance Sheet [Last Year Analysis] May 2007

	This Year	Last Year	\$ Difference
Assets			
Current Assets			
Cash On Hand			
Westpac - chq a/c	\$2,217.68	\$2,767.73	(\$550.05)
Petty Cash	\$10.00	\$10.00	\$0.00
Total Cash On Hand	\$2,227.68	\$2,777.73	(\$550.05)
Investments			
Westpac term deposit	\$17,317.96	\$16,553.03	\$764.93
ANZ term deposit	\$32,274.96	\$31,275.85	\$999.11
Total Investments	\$49,592.92	\$47,828.88	\$1,764.04
Total Current Assets	\$51,820.60	\$50,606.61	\$1,213.99
Other Assets			
Deposits Paid	\$50.00	\$50.00	\$0.00
Total Other Assets	\$50.00	\$50.00	\$0.00
Buildings			
Furniture & Fixtures			
Equipment at Cost	\$17,885.23	\$18,900.23	(\$1,015.00)
Less Accum Dep	-\$11,154.47	-\$10,766.28	(\$388.19)
Total Furniture & Fixtures	\$6,730.76	\$8,133.95	(\$1,403.19)
Total Assets	\$58,601.36	\$58,790.56	(\$189.20)
Liabilities			
Long-Term Liabilities			
Total Liabilities	\$0.00	\$0.00	\$0.00
Net Assets	\$58,601.36	\$58,790.56	(\$189.20)
Equity			
Retained Earnings	\$53,699.08	\$56,441.70	(\$2,742.62)
Current Year Surplus/Deficit	\$4,902.28	\$2,348.86	\$2,553.42
Total Equity	\$58,601.36	\$58,790.56	(\$189.20)

**SYDNEY RADIO CONTROL SOCIETY CLUB NEWSLETTER**

**Profit and Loss Statement  
July through May 2007**

	<b>This Year</b>	<b>Last Year</b>
<b>Income</b>		
Club Badges	\$105.00	\$9.00
Club Clothing	\$20.00	\$36.00
Donations	\$0.00	\$5.00
Gate Keys	\$905.00	\$285.00
Interest	\$1,764.04	\$1,773.87
Joining Fees	\$1,440.00	\$615.00
Member Fees	\$21,611.00	\$18,352.00
Scale Day	\$763.70	\$780.90
<b>Total Income</b>	<b>\$26,608.74</b>	<b>\$21,856.77</b>
<b>Expenses</b>		
Badges	\$472.90	\$0.00
Bank Charges	\$90.50	\$64.10
Competition Prizes	\$75.00	\$67.50
Consumer Affairs	\$43.00	\$78.00
Equipment Hire	\$178.04	\$110.00
Equipment	\$168.00	\$0.00
Field Maintenance	\$130.38	\$891.13
Food & drink	\$56.04	\$38.06
Gifts	\$284.47	\$37.99
Hall hire	\$0.00	\$55.00
Key refund	\$0.00	\$30.00
Locksmith	\$1,472.00	\$1,547.43
Website	\$484.00	\$742.50
MAS fees	\$16,263.00	\$13,586.75
Postage & shipping	\$119.25	\$174.00
Scale Rally	\$342.16	\$429.73
News letter	\$811.82	\$639.07
Stationary	\$108.90	\$32.65
Toilet Services	\$55.00	\$187.00
Refund of membership	\$552.00	\$797.00
<b>Total Expenses</b>	<b>\$21,706.46</b>	<b>\$19,507.91</b>
<b>Net Surplus / (Deficit)</b>	<b>\$4,902.28</b>	<b>\$2,348.86</b>



<b>Membership</b>	
Associate	9
Junior	4
Life	5
Pensioner	6
Senior	111
<b>Total</b>	<b>135</b>

## **WHAT SERVO DO I NEED?**

**by**  
**Mike Close**

I have been asked if we could publish something on this topic in the Club Magazine. As it happens I attended a seminar on the subject at Toledo during my recent visit to the USA. Admittedly it was being used as a vehicle to promote a particular manufacturer's products but it was interesting even though on most of the general information provided I thought 'I know that and apply it'. There was one point made, not directly involving servo type on which thought, 'I suppose I knew that but I don't apply it'. I will cover that point later.

During the seminar a question was asked, 'what exactly is a digital servo?' My instant reaction was 'what a basic (i.e. dumb) question' but I then remembered that the only dumb question is the one that is not asked and that the average modeller may not have the experience and background that someone like myself has. In fact I feel that there are a number of very good scale models flying, but not at our club, that have marginally powered servos fitted. I have specific reasons for thinking this and have discussed it with Neil Tidey, Mr Laser Engines, from the UK. He agrees and suggests that it goes back to when the modern servo was not available and people had to do the best they could. As a result some people have been used to fitting a particular size of servo and now have them available in the drawer from previous models, except that since they first used them the size and weight, and may be even the speed, of the models have increased.

There is vast range of servos available these days from different manufacturers. I am certainly not going to tell you that for a particular model that you should use Brand X Model Y. However I will give you information to help your own selection. If you find some of it confusing then either ask someone for further guidance or just use the bits of the article that make sense to you. It may give you a better result than you get at the moment. Obviously with what is available there are a wide range of technical parameters, with costs ranging from around \$10 to several hundred dollars. It is easy think that more expensive is better, and it may well be in some applications, but equally there is no point in spending more that you need for a particular aircraft.

When looking at what servo you need there are three technical parameters that you particularly need to look for, and one that may be important but is not usually specified. These are size/weight, torque and speed, with dead zone or resolution being the other one. Other things it is useful to know are what terms such as coreless, metal gear, ball bearing and digital actually mean, and what differences there might be between two servos, maybe even from the same manufacturer, that are different in price but whose written description looks almost identical. Finally I will look at some good practice issues associated with servo use.

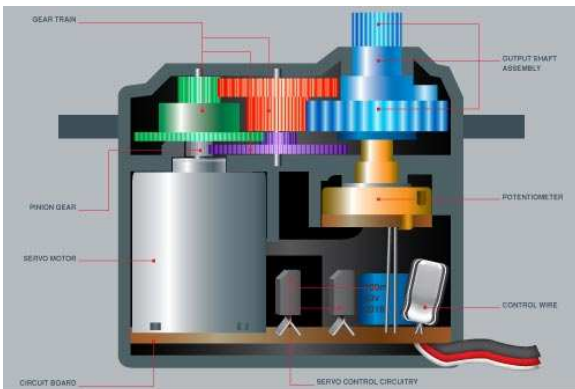
### **Size/weight.**

In the case of kits or ARF aircraft the servo size is usually determined by the design. You just hope that the designer has allowed room for a big enough servo to do the job. If not you have to get the scalpel out. Once you are into a particular size servo case the difference in weight is not usually significant unless you are really looking to save every gram that you can. If you are concerned about that then look at the weight, otherwise just check that the case size will fit. Beware that within the current convention of Micro, Mini and Standard sizes there are slight differences in overall size between manufacturers, and even within a particular product range, and it could be significant.

## Torque

This is arguably the most important parameter to consider. If you cannot find the operating torque for a servo that you are going to use on a flight control surface other than for a very small electric aircraft, my advice would be to use another type of servo. Most manufacturers only specify one torque figure. At least one specifies two, torque and holding power. The latter figure is much higher and is the force that the servo will hold once it is in position. Relevant but not particularly useful if the servo can't get there in the first place. Torque for model use is usually specified as X oz/inches or Y Kgm/cms depending on whether measured in imperial or metric units. 1 oz/in is equal to 0.072 Kgm/cms if you have to compare servos that are in different measurement units.

If you have insufficient torque for the specific application one of two things will happen. Either the servo will operate to the required position but it will be slower, or it will stall before it gets there. (For a given size control surface and at constant air speed the torque needed increases as the control surface moves further from the neutral position.) Either way the drain on the aircraft radio battery will be considerably more than with the correct size servo. In most cases there is no particular disadvantage in using a servo with more torque than needed and you can always argue that a bit in reserve is always good. It may be that the quiescent current is a bit higher, but not automatically so, and in practice this is unlikely to be a major consideration anyway.



All that is fine I hear you say but what actually do I need? The faster that the model flies, the larger the control surface and the more deflection that it has, the more torque is needed. Most people are either guided by their own experience, what the kit manufacturer says, what the servo manufacturer gives as guidance, or what others have used successfully. In most cases that would probably be all you need but what happens if you either get conflicting advice, just don't know, or don't have confidence in the answer. The last thing that

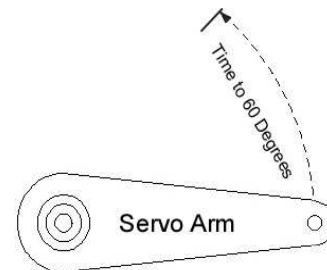
you want is to spend a couple of thousand dollars on an airframe and worry that it might be at risk because you did not spend another \$100 on a bigger servo.

In fact I always do a theoretical check every time I build a new model. There are a number of free programs available to do the calculation for you. The one I currently use is available on the web at <http://www.geistware.com/rcmodeling/calculators.htm> and the program can be downloaded. You put in the parameters of the model and the control surface information and it gives an answer. Most of this information is factual but you have to estimate (I prefer saying this rather than guess) the maximum speed. There are other parameters you can change but these might be considered fine tuning and not normally necessary. As well as a specific maximum torque figure it also produces useful graphs to show the sensitivity of the maximum torque required, for example, to changes in maximum speed or servo deflection. During the seminar the speaker said that he felt that the torque given by these types of programs was sometimes a bit lower than he would have expected. Obviously I can't change his view but my experience with the programs that I have used is that the results usually seem reasonable. However I have certainly found on some occasions that I would not have fitted a big enough servo or say in the case of a small deflection aileron that the servo that I was fitting was too large, not that I have always fitted a smaller one as a result. Of course maybe I am another modeler that also fits servos that are too small!

It may not be necessary to always fit the maximum power servo recommended. An example might be for a large rudder on a scale model. You are probably not going to use full rudder deflection except on the ground, and even when in the air and the aircraft is slowing just before landing you might use no more than half the available deflection. In this case you may decide that a less powerful servo is all you need and decide what is the power that is needed not to stall by looking at the speed and deflection charts. You would probably not make the same judgment for an aerobatic aircraft when you intend to do full power knife edge loops. Be careful of the judgments you make if you do this. For example if you are looking at the elevator servo don't forget recovery from an out of control dive where the airplane might be flying faster than in full power straight and level flight.

## Speed

This is usually quoted as the time the servo takes to transit over 60 degrees. You would hope that it is always specified at rated torque as you would expect that as the load increases the speed does drop off a bit. In principle the faster the better but what speed to do you need? The only disadvantage in speed is that it is possible that a very fast servo driving a heavy control surface might overshoot the required position before settling at the correct point. In most cases that is unlikely to be a serious practical problem. With any given internal servo motor, the servo designer has to consider the trade off between speed and torque. Indeed there are servos which are identical except for the internal gear ratio. The higher the gear reduction from the motor to the output shaft the more torque is delivered but at a lower transit speed.



So what speed do you need? For other than more specialised applications we would usually just accept the speed that we get after having looked at other requirements. If you need a fast control response you need a fast servo. Helicopter gyros require a fast response to maintain the heading well and it is usual to use a servo with 0.1 sec per 60 degrees or better for this application. If you are flying a highly responsive 3D model you might need a speed approaching this and certainly faster than 0.15 sec. For the average sport model something around 0.15 to 0.18 would be more than adequate. If you had a large scale model or a large sailplane you are unlikely to operate the control fast anyway and in practice you would not notice any difference in performance by using a servo that operated as slow as a quarter of a second (0.25 sec) for the 60 degree movement. Obviously with this type of model it is very unlikely you that you would ever put in an instantaneous input to require the total servo travel available.

## Dead Zone/Resolution

The dead zone of a servo covers the amount that the servo can be moved before it tries to move back to where the servo is actually being commanded to go to. This will depend on the design of the servo. With conventional servos the load that is being applied will also affect how near it settles to the actual required position, as near the final position the torque applied drops off, but this is probably better defined as resolution rather than the dead zone as such. In most applications the smaller the dead zone the better but it is not a parameter that is usually specified. I will discuss this again in latter sections.

## Servo Types

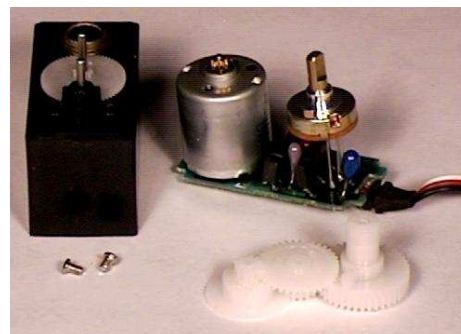
Once you have decided on the technical parameters you need, there may still be a lot of alternatives and at very different prices. Even for some that are exactly the same in terms of technical

parameters there could be a considerable price difference. This does not necessarily mean that the more expensive one is better. It could be just that one manufacturer has a more cost effective design, that he has done a better deal with the component manufacturers, that he uses lower cost labour or better production processes for the same quality final product, that he has lower distribution costs or has made a decision to go for lower margin sales through the whole distribution chain in a order to get an increased turnover.

One manufacturer however has economy servos and deluxe servos which are nearly identical in specification. As the speaker at the seminar represented this manufacturer it is worth recalling what he said about them. The economy servo is engineered down to a price. This is so they can compete in the price sensitive market and provide competitively priced boxed Tx/Rx systems. The economy servo uses what may be a simpler design with lower quality, and hence cheaper, components - both electrical and mechanical. As a result it gives the same data sheet performance but will not be as reliable and for example will probably have a wider dead zone. Of course even the most expensive servo can fail the first time you use it but the probability of that is very low. If you are using a 'cheap' servo in a model you care about then I would suggest don't use it in a primary flight control application and just have it on the throttle, if at all.

Servo Gears are usually plastic or metal but some manufacturers do use a non metal material which is softer than metal but much harder than plastic. Metal gears are stronger and less likely to have teeth broken off by minor flutter or a minor crash. They are more expensive of course and a bit heavier. Some manufacturers do compromise and have metal output gears with some earlier gears in the gear train, where the load is very much lower, that are still plastic. The smaller the case, it is likely that the gear wheels are also smaller and hence have smaller and more fragile teeth. Because of the increased manufacturing cost they are often more expensive as well. I suggest that you never go to a smaller size servo unless you need to for weight or size considerations. Which gear type do you pick if there is choice? You would hope that all manufacturers design the gear train so that no failure will occur at the maximum rated output torque, but how much margin is there for loads above that, particularly transient loads? I would usually go away from plastic output gears for larger aircraft or any that fly particularly fast. Would you get away with plastic in them? Yes probably, but it is a matter of considering a few 'what if' scenarios and making a judgment.

Early servo motors all had a rotating armature in the middle of a fixed magnetic field. Now so called coreless motors are available which do not have this heavy rotating mass. The motor type is more expensive to manufacture but because it does not have the inertia it is usually faster and more precise for the same input power. If you need the performance then it is worth the extra but if you don't then you need to make a decision.



Cheaper servos have plain bearings on the output shaft.

More expensive servos have either one or two, and occasionally three, ball bearings to support the shaft. Obviously for the extra cost you get a smoother motion and with less friction, particularly under heavy loads and the life will be longer. On more valuable models many would consider they are essential.

Until a few years ago all servos worked using exclusively analogue technology. Most transmitters work by generating a pulse for each servo channel usually with a pulse length of 1.5 milliseconds at the servo neutral position. As the pulse length is changed the servo moves so that the internal circuitry balances this modified pulse length and the servo turns to the new position. As it gets

nearer to the correct position the driving power drops off. Depending on how many channels are used the pulse is repeated something like every 10 to 20 milliseconds. How accurately it works depends on the quality of the components and the strength of the motor.

Now so called digital servos are available. These still take the same input pulse, but convert this internally. The servo electronics and software work out where the output shaft should be and moves the servo arm to that position. The signal is digitised and can act almost like an on off switch. If the servo output shaft is only slightly off the servo motor can be driven at full power to the correct position. Thus they can be very accurately positioned with almost no dead zone even with a high load applied. They are designed to operate all the time not just when they receive the pulse and as well the pulses can be sent much more frequently with no adverse effects. For example in a helicopter gyro designed for use with digital servos the pulse will be sent to the servo very much more frequently. Modern gyros often have a switch to select the servo type as sending a more rapidly repeating signal to an analogue servo will usually cause it to overheat and fail. Of course sending the signal more frequently gives the servo the ability to be more responsive in sensitive applications. Another big advantage of digital servos is that they can be programmed and some manufacturers sell programmers which the customer can use. Many of the parameters can be programmed for either servo matching or for the particular application. Programmable parameters include servo reversing, (yes I know most of us have that on the transmitter but what happens if you want to use a Y lead and one goes the wrong way?), a fail safe position, servo speed, servo travel, servo centre and the dead zone. The last ones are particularly useful if you need to accurately match multiple servos. Examples of this are if you have one servo on each elevator half or if several servos are needed to get enough power to drive a single control surface without distortion. The latter case is also where you might want to program the dead zone. There will always be a small residual unbalance and the last thing you want is for one servo to be pulling when another one is pushing. Very quickly you will have a flat battery. Opening out the dead zone slightly will stop this without generating any practical problem with the accuracy of the setting.

Obviously there are very definite advantages in using digital servos but there is of a down side and that is price. Also because of the extra components needed they are not yet available in the smallest case sizes. If you want the best and can justify the higher cost for the better performance then the choice is obvious.

### **Good practice**

When I first started in radio control, the transmitters did not have servo reversing or travel adjustment. You just had to do it by the mechanical settings and positions. Both of these electronic features are now normal. Servo reversing is very good until you select the wrong model and the engine goes to full power with the transmitter set to idle, but we all use it. However do you just connect the servo push rod and then adjust the travel on the transmitter until you get the control movement that you want. This is not good practice unless it is just for fine tuning at near full travel. In fact at the seminar the speaker suggested that we should be using the servos near the maximum amount of travel the transmitter can give us, 120 or 150%, and then set the mechanical arrangement to suit.

The reason for this is that any free play that there is in the linkage, the rotational dead zone, and any error due to a non digital servo not going back to the exact neutral position even though it is getting a signal to move, are all fixed. As a result if the total travel is reduced these errors in the system are a much greater percentage of the travel you are using and so become a much greater amount of free play or error in the control surface position. If you are getting too much control surface movement at full servo travel go for either a hole in the servo arm nearer the centre or one further out in the

control horn. The latter is better if it is physically possible as it maintains a larger movement of the control rod so the effect of any free play in it is minimised. Obviously if the angular movement on the servo arm is reduced the speed between the limits of full travel is increased, but if you need to do this for the reason of the speed then the likelihood is that the extra play in the system will actually make it unstable.

If I have a split elevator and am using the same servos for the aileron as well, I always check the speed and travel of all the servos before I start the installation. There are usually some differences between servos of the same type and from the same batch so I find the pair that has the best match for the elevators. I reckon that the ailerons are less critical if they are slightly out of synchronisation when they move.

The servo gears are greased during manufacture. The speaker at the symposium suggested that we should open up the servo and regrease them with the appropriate grease on say an annual basis. I don't do this myself and had never thought about it. I do it if I have to replace a damaged gear though.

The final point is the one that was raised in Toledo which I thought 'I suppose I knew that but don't apply it' and this concerns batteries. As we use more powerful and greater numbers of servos in our models this increases the average current drain on our flight pack. With improvements in technology we can now get lighter and smaller batteries with much increased capacity. When I started, the normal flight pack was 500 mA H with AA size NiCad's and it usually lasted about 5 flights. Now it would be typically fewer flights. Today there are 2500 mA H NiMh batteries of the same size and weight. However it was pointed out that these batteries have higher internal resistance and so as you draw the higher currents out of them you get a much higher internal voltage drop which reduces the actual power of the servo. It was said that many modellers use a 6 volt pack, not because they want the extra voltage but just to maintain approximately 4.8 volts under load. If you don't want to do that then you should consider getting the same battery capacity but from a larger case size such as a sub C NiCad which will have a lower internal resistance. Of course they are obviously larger and heavier. A good point I thought, there is little point in buying a powerful servo and then reduce the power of it by 25% by running it at a lower voltage when it is really working hard.

### **Summary**

There is a very wide choice of servos available and at very different prices. Getting the right one for your model can make a considerable difference to how it flies and avoiding what could be 'terminal problems'. The selection is much more than just any standard servo will do. Hopefully the information provided in this article will help you to make more informed decisions so that you get the right servo for the job. This, without having to purchase the most expensive servo available and making the assumption that this must be playing it safe. It might or might not be, but is a sure way of quickly becoming poor.

## **Sopwith Triplane**

The Sydney Radio Control Society is very lucky to have a modeler of Robert Zyp's caliber as a member. Over the years he has produced some excellent models and has competed and represented the club very successfully at scale events all around the country.

His latest effort to roll out of the hangar is this magnificent Sopwith Triplane.



Here is a brief history of the Sopwith Triplane courtesy of [www.aviationhistory.com](http://www.aviationhistory.com).

In their search for an outstanding fighting aeroplane the Sopwith experimental department decided in early 1916 to build an entirely new design--a triplane. The completed machine had three narrow-chord wings. The combined wing area of the three mainplanes gave the aircraft plenty of lift. Ailerons were fitted to all three wings; the interplane struts were plain but strong and few bracing wires were needed. The fuselage was a typical Sopwith wooden box girder. Tail- plane, elevators, rudder and fin resembled those of the Pup, but later production models had a tail-plane of reduced area. The handling qualities of the Triplane were excellent. It is now regarded as only slightly less maneuverable than the Pup, but many pilots preferred it to the little biplane.

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The triplane layout was adopted in order to give the pilot the widest possible field of vision, and to ensure maneuverability. The central wing was level with the pilot's eyes and obscured very little of his view, and the narrow chord of all the mainplanes ensured that the top and bottom wings interfered less with his outlook than the wings of a biplane. The narrow chord aided maneuverability, for the shift of the center of pressure with changes of incidence was comparatively small; this permitted the use of a short

fuselage. At the same time, the distribution of the wing area over three mainplanes kept the span short and conferred a high rate of roll.

Looking back, it is hard to realize the revolutionary nature of the Triplane at the time it appeared. Nothing quite like it had ever been built for military purposes, and the best measure of its success is provided by the profusion of German and Austrian single-seat fighter triplanes which appeared after the impact made by the Sopwith Triplane

It has been said that Anthony Fokker was so anxious to produce an aircraft which would be an adequate reply to the new Sopwith fighter that he resorted to subterfuge to obtain an example of the Triplane. He contrived to arrange for the delivery to his works of the remains of a Sopwith Triplane which had been shot down, despite the fact that the aircraft should have gone to the German experimental field at Adlershof. However, the Fokker Dr. I Triplane which was ultimately designed by Reinhold Platz, Fokker's chief designer, was a very different aeroplane from the Sopwith Triplane.



**AIRWORTHINESS CHECK**

**INTERNAL FUSELAGE**

Check servo mount, servos, and servo arms secure.  
Check pushrods/linkages secure and outers on flexible snakes secured (if used).  
Check clevises positively locked closed.  
Check all electrical connections secure.  
Check for loose items.

**WING**

Check for breaks, warps, covering security etc.  
Check servo mount, servos, and servo arms secure.  
Check ailerons/flaps for security.  
Check aileron/flap/undercarriage pushrods, linkages, and horns secure.  
Check clevises positively locked closed.  
Check wing attachment points on both wing and fuselage, and wing bolt seating or integrity of rubber bands (as appropriate).  
Check wing electrical connections secure.  
Check struts and rigging (if equipped).

**ENGINE AREA**

Check engine mount, engine, muffler, prop nut and/or spinner security.  
Check prop for nicks cracks etc.  
Check nose steering mechanism (if equipped).  
Check cowl secure (if equipped).

**TAIL SECTION**

Check vertical fin, rudder, and rudder horn/clevis for security. Check clevises positively locked closed.  
Check tail wheel security (if equipped).  
Check horizontal stabiliser, elevator, two piece elevator joint (if applicable) and elevator horn/clevis for security. Clevises should be positively locked closed.  
Check outers on flexible snakes secured (if used).  
Check struts and rigging (if equipped).

**UNDERCARRIAGE**

Check main undercarriage legs for security.  
Check all wheels rotate freely and wheel collars secure.

**RANGE CHECK/STARTING ENGINE**

Ensure radio batteries have been adequately charged.  
When frequency available and key in board, check radio range with transmitter antenna collapsed.  
Check and ensure all flight and engine controls move in the correct direction.  
Check neutral position of flight control surfaces.  
Check retract operation and wheel well clearances (if equipped).  
Check operation of ignition/glow plug heater system including cutout (if equipped).  
After starting engine, check full power operation (with nose up if practical).  
Check idle operation and power up response.