

# Radi- C- ntr- lled Soaring Digest

August 2009

Vol. 26, No. 8







Front cover: Derek Robertson's Spitfire flies against a mountain backdrop near Applecross Pass, Scotland. Photo by Jim Livingston. For the story behind Derek's trip to the slope and more details about his Spitfire, please see his article starting on page 16 of this issue. Nikon D70, 1/800 sec., f11, 300mm

- 3** *RC Soaring Digest* Editorial
- 4** **CEWAMS Opener 2009**  
Bill Henley reports on this group's first outing of the year.
- 10** **The Craftsman Techniques of Paolo Severin**  
Paolo Severin describes the methods he uses to weld stainless steel tubing to form fuselage and tailplane frames and create realistic wire trailing edges.
- 16** **Reach for the Skye**  
Derek Robertson provides the cover photo details.
- 19** **Uncle Sydney's Gossip Column**  
*Preview of 7th F3J European Championships, Wloclawek, Poland*  
Can Sebastian Feigl do a "David Hobby"?  
By Sydney Lenssen.

## **A Little More Complete History of RC Radios 27**

The workings of early RC. By Pete Carr

## **My First Radio 38**

Jim Laurel talks about his entry into RC soaring.

## **I Wanted One & I Got One! 39**

Jerry Slates entered a free flight contest and got hooked on RC. Now he looks back on those early days in the hobby and talks about the technology of the time.

## **New at TailWindGliders.com Aufwind in English 44**

Curtis Suter introduces two new spreadsheets and Aufwind begins publishing an English version of the premier German model magazine.

## **On the 'Wing... Windlord XC 45**

Continued construction of an enlarged plank designed by Ken Bates. By Bill & Bunny Kuhlman.

## **A Summertime Sunset 48**

Photographs of Ole Kanestrom's Tabooish flying at Port Townsend, Washington, by James Curtis. Another of Curtis' images graces the back cover of this issue.

# R/C Soaring Digest

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## In the Air

This issue features some material from Paolo Severin, an Italian modeler *par excellence*. Paolo contacted us at the suggestion of Cesare de Robertis, Editor of *Modellismo* magazine. Paolo's *forte* is realistic scale models, and in his endeavors at realism he has perfected the skill of welding stainless steel tubing. This has allowed him to create some quite beautiful fuselages for powered models, including a J-3 Cub, as well as curved tube tailplanes. Additionally, he has, with the help of special parts created via CNC, been able to create wire trailing edges. Although Paolo has so far focused on powered aircraft, he is currently in the process of designing and building a large scale RC sailplane for a friend. The techniques he outlines in this issue are certainly applicable to a large number of worthy vintage soaring subjects. Be sure to check out Paolo's web site! <[www.paoloseverin.it](http://www.paoloseverin.it)>

One aspect of *RC Soaring Digest* which has undergone tremendous growth and improvement since moving on-line is the photography. The advent of digital cameras with pixel counts of greater than 3000 x 2000 and sensors better capable of accurate color reproduction has certainly been a major influence, but PDF production has improved markedly as well. These two factors combined have allowed us to publish exceptional photography with the knowledge that *RCSD* readers can appreciate the images to the fullest.

If you have a photo, sailplane design, construction technique, experience or any material related to RC soaring, we enthusiastically encourage you to submit it for publication in a future issue.

Time to build another sailplane!



# CEWAMS OPENER 2009

## *A TRIP TO BALD BUTTE*

Bill Henley, [bill-henley@comcast.net](mailto:bill-henley@comcast.net)





Bald butte is 3764 feet of wonderful slope rising over 2200 feet above the Hood River valley with Mount Hood just 14 miles away. Some of the CEWAMS guys — Chris, Bill, Mike, Steve and Erik agreed to go with Phillip whining about having a cold and couldn't make it but did.

We agreed to meet on Friday or Saturday May 22<sup>nd</sup> or 23<sup>rd</sup> at the top of the Butte. I for one hadn't been there before. Chris made up maps and directions.

After a long drive muttering "I hope it's worth it at the end" I finally get lost. Then I talk to some real country types on a dirt road about finding the butte. He gives me very complicated directions then asks his wife "Isn't that right?" She says "NO, just take the third left and follow it to the top". She was right.

I stopped at the bottom of what looked like an impossible road that went straight up a very steep hill and called the guys. "This can't be the road can it?" "Yup, you found it. Just follow it, watch the switchback and you can't miss us. Oh, and don't stop on the long steep part after you get out of the woods."

What woods? I thought I WAS looking at the steep part. Put my new Kia into 4 wheel low and just go for it. Great SUV, never missed a beat. Quite the road.

Coming over the really steep part at the end there are the guys and what a slope. It faces SW and rolls off the top with no trees for about 600 feet down slope.







Left: The parking area at the top of the butte. The slope goes down about 600 feet before trees appear.

Right: Philip Patton (left) waits his turn at Bill Henley's Meade 12" LX200 GPS SMT telescope. Steve Allmaras is watching climbers on Mt. Hood, about 14 miles away.







Left: Philip Patton (circled) up a 100' tree looking for his FunOne. Lesson learned: charge your batteries!

Right: A couple of tailless slopers flying in the excellent lift found at Bald Butte. The uninterrupted vista, with Mt. Hood in the background, makes this site additionally attractive.







Left: Mile Daily launches his Art Hobby Thermic into the Bald Butte lift.

Below: Forest, the CEWAMS mascot, takes a break with what appears to be a Boomerang.



The valley below looks very quaint and like something out of a travel brochure. Mount Hood dominates the awesome view. And there is almost no wind.

I set up camp with the others and the wind starts blowing at about 15 mph. The lift is great and we fly until the sun starts setting. It is almost as good as Eagle Butte and that's saying a lot.

After dinner the CEWAMS guys start the other part of our group outings and haul out the telescopes and adult beverages.

We pulled out several small scopes, an 8" and a 12" Meade. These are seriously dark skies and we had a great time looking at all the celestial wonders until everyone but Chris and I finally called it a night at about 4:00 AM.

The wind blew all night and picked up a little and shifted straight into the hill and remained that way for the next three days. Next morning we could see climbers on top of Mount Hood with the 12" telescope, dots moving around 14 miles away.

We went back to more flying after breakfast. We mostly flew foam, but a couple of guys did fly crunchies. There were several types including a Bee, a Lumberjack, a Boomerang, an M-60, a carbon wing Fun-One, my EPP Jart, a JADE Impulse and several others including the Sheetrock, Chris' 6' span flying wing. All made it home except for the Fun-One when Phillip was reminded why you charge batteries. We searched the deep woods behind the hill and Phillip had the wing flutter down in front



of him, but we never did find the body even after he climbed a 100' tall tree to look around. (He's just turned 60 going on 18).

On Sunday about eight guys showed up with 60" JWs and flew like crazy for a few hours and then left.

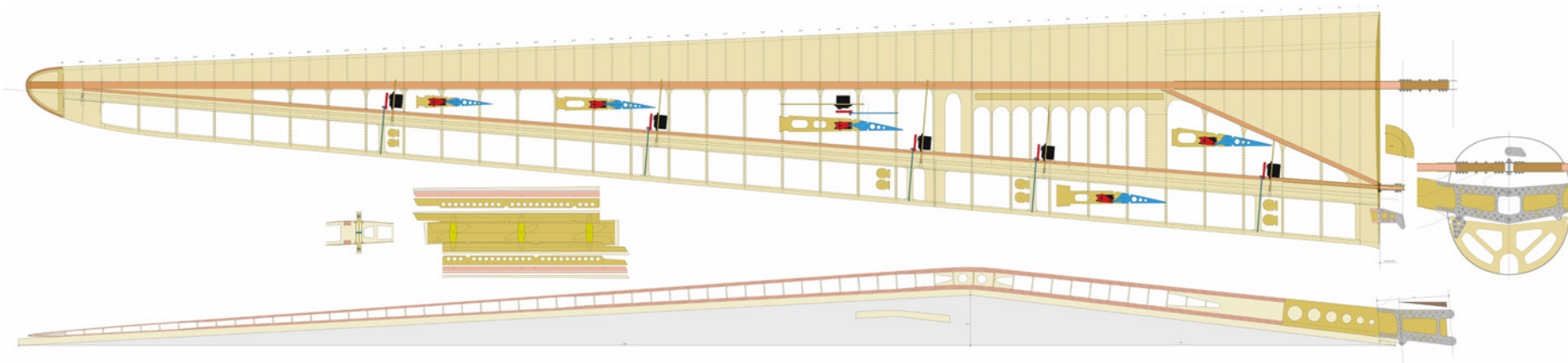
Steve flew his Prodigy and got blown back behind the hill going very fast. We all knew it was destroyed. He walked back and found it in the middle of the path with only a small ding on the tail. He must live right.

The flying and night time viewing remained great until we left on Monday. Driving out I remembered the "I hope it's worth it" thought and was very glad I came. Definitely worth it!

With parts almost lifted from Phillip's slope report.







# THE CRAFTSMAN TECHNIQUES OF PAOLO SEVERIN

<http://www.paoloseverin.it>

We received an email message from Paolo Severin asking if RC Soaring Digest would be interested in publishing information on his activities. Paolo included a beautifully photographed press release <<http://www.rcsoaringdigest.com/pdfs/SeverinPressRelease.pdf>> with his message. One look at that document and we were intent upon displaying Paolo's work within the pages of RCSD.

While all of Paolo's aircraft are powered, there are several reasons for including

his techniques in RCSD. All of the Paolo's machines are large scale projects which are based on a welded stainless steel tubing fuselage framework. Paolo has this technique perfected. The results are a very strong lightweight structure which is incredibly realistic. This technique, as can be easily imagined, is not limited to powered aircraft, although it appears to be an ideal construction method for aerotow tugs. One of his current projects is the building of a large scale (1:2,5) Borea sailplane, a Luigi Teichfuss design, for a friend. (Wing plan above.)

Additionally, Paolo has perfected the use of piano wire for trailing edges, precisely duplicating the look of aircraft using the same system. Many of the pre-WWII gliders and sailplanes incorporated wire trailing edges, and being able to replicate the construction material and methodology is always of benefit to the scale modeler.

It should also be noted that Paolo is now producing kits of a number of aircraft which utilize his construction techniques and materials. Be sure to check out Paolo's web site!



# WELDED TUBE FRAMES

I have been building for the last few years almost all the scale reproductions airplanes with a fuselage structure made with welded tubes.

The first airplane I built using such technique was the Fieseler Storch.

Not only I like them very much, but these structures are incredibly light and strong, (see the article about the Piper Cub). Also they are very quick to build.

## The materials

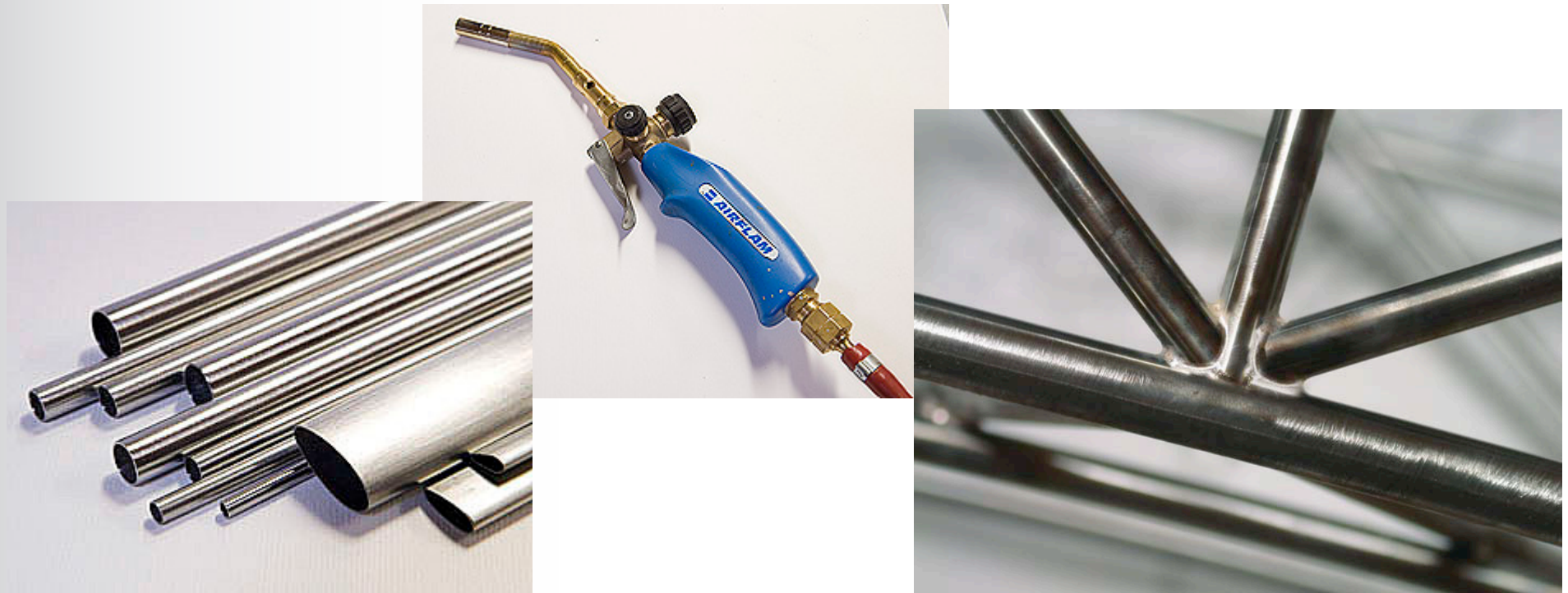
The material I normally use is a stainless steel tube in various diameter sizes, ranging from 3 to 9 mm (0,118" to 0,354"), having a thickness of 0,25mm (0,01") or 0,5mm (0,02") for the most stressed out parts.

I use 30% silver alloy bars for welding. It's sufficient to use a GPL or Butan gas welding pipe, you can find also some

pipes that work with the cigarette lighter type of gas, in this case they don't last long.

Even an oxygen type of pipe is ok, however I recommend to keep the flame very low and at a certain distance because it's very powerful and, if the stainless steel overheats and turns black, can not be welded.

Anyway a slight blackening of the tube is normal.



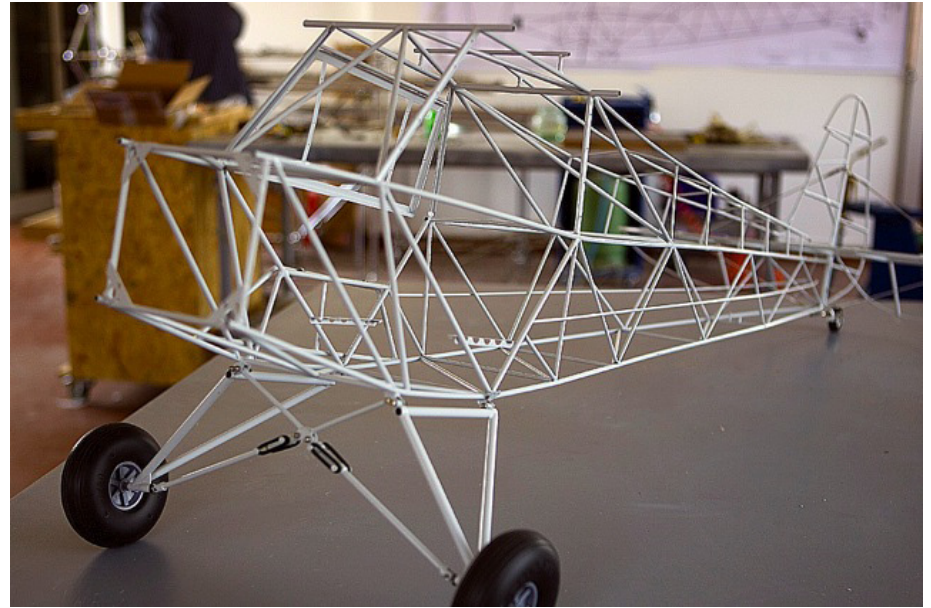


## The welding technique

The gas pipe, which has a wide flame, is good to weld the tubes together, the oxygen pipe is better for the welding of massive parts and the heat can be concentrated in precise spots. I suggest beginners buy only the gas pipe.

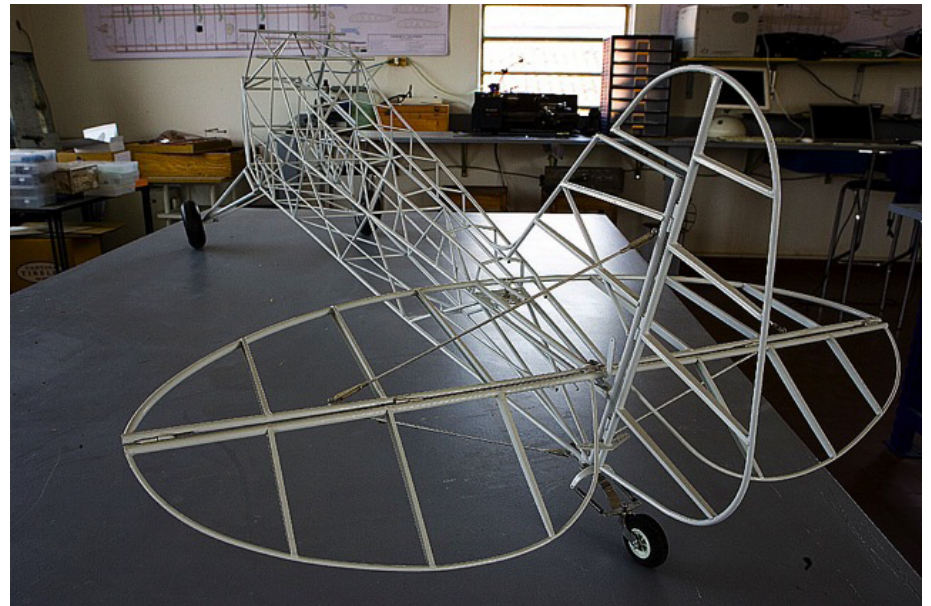
The tubes must be prepared to fit very closely with each other, using a round file to make a groove in the tubes that will be welded end to end. Small cracks can be filled with the welding alloy.

After positioning the two tubes, the tip of the welding bar has to be slightly preheated and it's laid at the tubes crossing and heated until it melts. When the welding alloy starts to melt make sure that flows where you want to. Keep in mind that the welding alloy flows towards the hotter parts, therefore it's sufficient to heat ahead of it so as to guide it to the required point. It sounds easy but it needs some practice. I suggest practice with some tube scraps before making the final weldings.



*Below left: A fuselage frame under construction.*

*Above & below: 1/4 scale Piper J-3 Cub tube fuselage.*





As a general rule keep in mind that if you have to weld two tubes or plates of different thickness the flame has to be on the side of the thicker object to heat this first. You can use the welding bar to protect from the flame the part that don't want to be heated. Don't be in a hurry but don't dwell too much on the same spot, oxidation is waiting to happen.

If the tube becomes incandescent it oxidizes, so when you see the tube that starts turning red lower the flame and move it away from it.

To go over a welding, add some welding alloy drops in the cracks or to fill holes, wait until the welding cools down, then soften the bar tip using the flame and lay the bar on the point to be rewelded moving the flame away often and dwelling at the right time, otherwise you may melt the first welding.

### Fuselage construction

I have found out that an iron working table is very suitable for the job. My table is a 2mm galvanized iron sheet measuring two



*Fieseler Storch Fi 156 in 1/4 scale*

meters by one meter with the long sides bent at 90° for 4 cm and resting on a wooden table.

I start building a fuselage outlining with a marker the structure on the metal sheet, then I line up the tubes blocking them in position with strong magnets that I retrieved from old computer hard disks.

At this stage I begin welding, starting from the plane nose towards the tail. It's important to proceed in subsequent steps because the tube tends to expand and must be left free to stretch out towards the tail. The second side must be built aligned with the first one so as to have two sides exactly the same. Having done that the two sides must be aligned with each other using some reference points on the table, magnets and right angle squares. The first cross braces and diagonals will then be welded, paying a lot of attention to the alignment, as the work goes on it will be easier and easier.

Usually it takes me a day to frame up a fuselage. Appropriate stainless steel plates will then be attached to the structure for the motor mount, the landing gear, the wing, the wire cabana struts (on a biplane), etc., these details vary depending on the model.

### Other steel components

Many planes had also a steel tailplane, some had the ribs made with small tubes, others with bent plates. The landing gear is another component that most of the times is made with stainless steel tubes. I always try to copy the full scale landing gear, shock absorbers included, using chromemolibdenium tubes, the same as used on the full size airplane.

### Residue removal and painting

Once finished, the structures will have to be carefully cleaned to remove the antioxidant which usually tends to leave very resistant glass residues.

They can be removed with sand paper, small files and some patience or, as I do, using some residue remover in an acid gel





*Solartex covered 1/4 scale J-3 Cub*

form., You can find it in workshops specialized in welding. You can also leave the structures unpainted, being in stainless steel it will not be a problem. I often have them painted with epoxidic paint, but it's only matter of taste.

### Covering

Usually a framed style fuselage is covered with fabric in the tail area and aluminum in the front. You will find these techniques explained in my articles especially in the Piper Cub instruction manual, which is covered with Solartex, I suggest also the use of Dacron (The same used on the real airplanes.), it's more difficult but it's worth the effort.

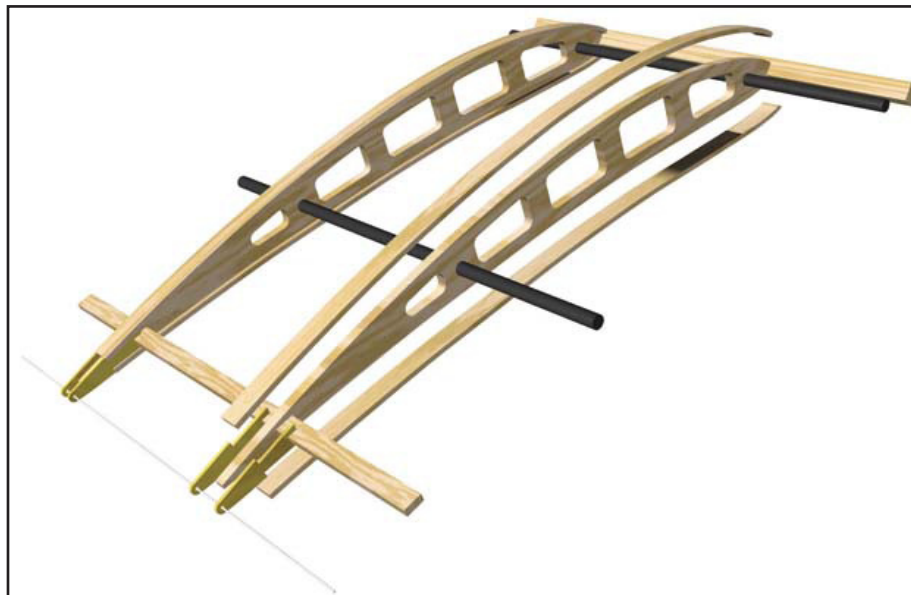
## TRAILING EDGE OF STEEL WIRE

Starting from the Wright brothers biplane to the thirties, many airplanes featured the wing trailing edge, and often even the tailplane, with steel wire. This method featured, once the covering fabric was tight, the typical “bat” or “wavy” trailing edge design.

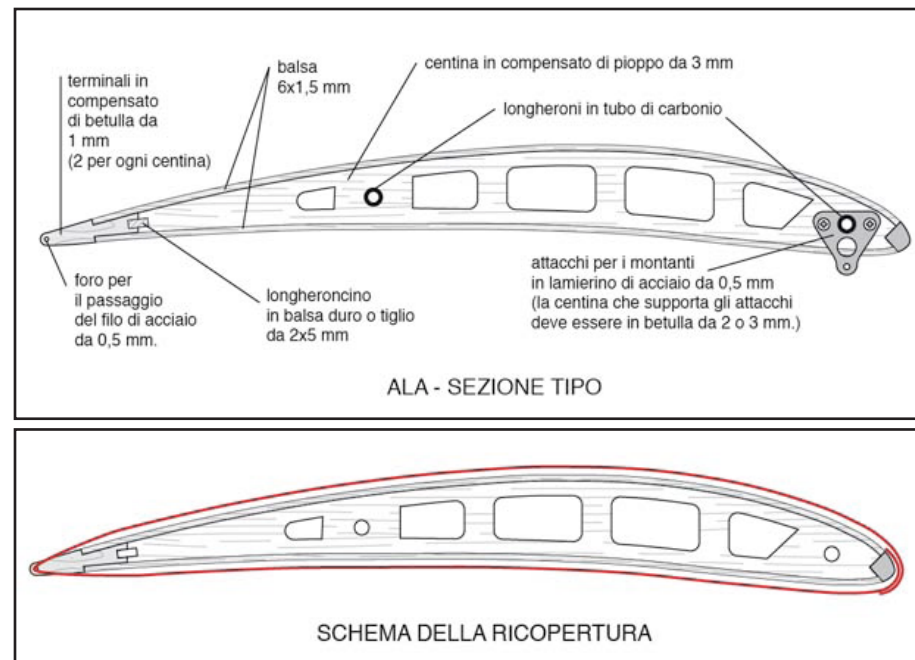
Usually modelers simulate such design by shaping a balsa trailing edge. This method, however, unless it is done by an expert, turns out to be very delicate and approximative unless a light plywood is added to the balsa.

I, as usual, copied the original system and use a 0.5mm steel piano wire as trailing edge, that as it's covered with the fabric takes the shape of the “bat” design trailing edge same as the full scale planes. The drawings below show the system I used for the wing of my Fokker DR1, in this case I used some carbon fiber tubes as main spars. I used some 1mm plywood end caps, cut on the CNC pantograph, to keep the wire in line, anyway there are other methods. To be noticed the necessary small longeron, about 2mm x 5mm, positioned very close to the trailing edge.



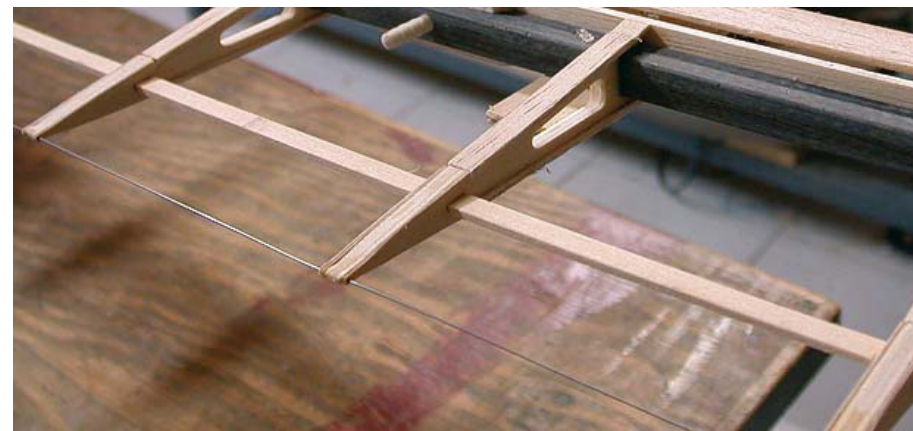
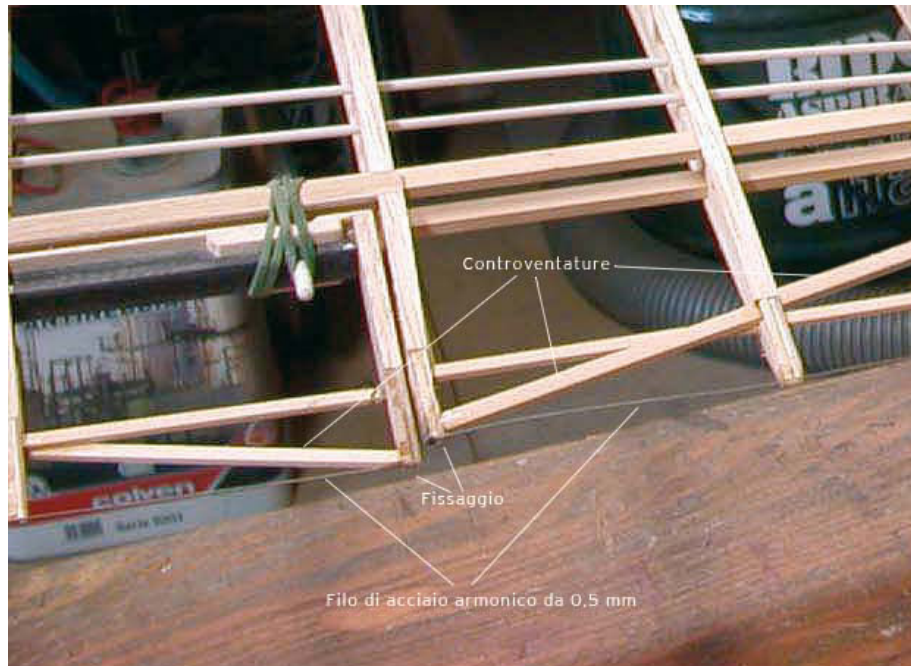


CAD drawing of the basic parts of the wire trailing edge system, including ribs, rib caps, and specially made wire retainers.



Above: Cutaway drawings showing basic structure of the wire trailing edge construction technique and the necessary covering using a single piece of fabric.

Below: The wire trailing edge of Paolo's Caproni Ca100. Note the bracing at the ends of the trailing edge to support the wire tension and the specially made fixtures at the rib ends.





Some tricks must be used in order to use such a technique:

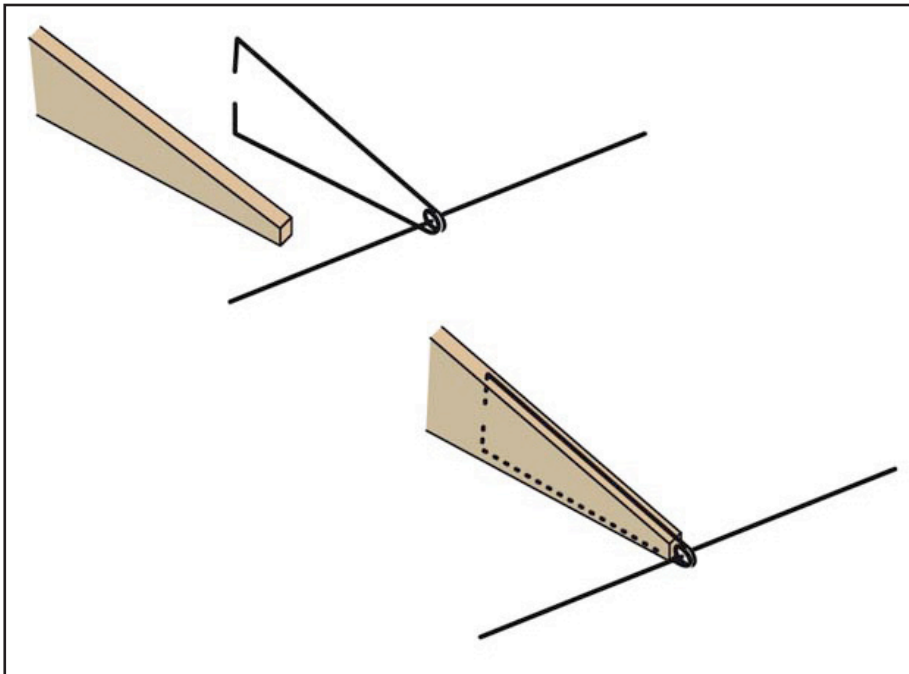
1) The wing must be covered with a single piece of fabric, with the junction and the overlap under the leading edge. This requires the use of fabrics having the proper height, for instance the Solartex is about 60cm, therefore allows the covering of wings having maximum a 29cm chord. The Dacron® I am currently using is 160cm high, and I had no problems so far.

2) The trailing edge of the two end ribs must be properly reinforced because the fabric tension pulls strongly on the wire.

The two photos show the system used on my Caproni Ca100.

Another way to fix the wire, if you don't own a CNC pantograph, is to make some eyelets using the 0,5mm piano wire, and epoxy them to the end of each rib (drawing below). This is the system that I used on my Albatross D5a. It works equally well and it's stronger than the previous one.

— Paolo Severin



# REACH FOR THE SKYE!

Derek Robertson, [friedegg1@btinternet.com](mailto:friedegg1@btinternet.com)

The hill looked fairly innocuous on the map! There was even a single-track road that ran along the bottom of the west side... OK, it was a little higher than the slopes we use back across in the Aberdeen area, but legging it to the top would mean covering much the same sort of distance we older guys regularly “wheeze” over while getting to flying sites. Any reservations I had were quickly put aside when one of my pals assured me that the top of the hill boasted a generous covering of heather.

Yes, this was the occasion of our annual “hill walking” trip to the west coast of Scotland at the beginning of April '09, in this instance a week of self catering heaven in Lochcarron. A group of four 50-something's hell bent on over-eating, excessive drinking and reckless exercise... activities not really befitting bodies approaching their twilight years! However, the gloss and danger had been taken off the occasion when our wives talked themselves into joining us with a view to introducing the joint voice of “moderation” to proceedings. Mmmm???

Anyhow, back to the story! So, having been sold on the idea of a “stroll” up Craig Mhoal, I put my crossword puzzle down









but was forced to hold onto the previous night's hangover as I loaded my Spitfire, boots and high fat snacks into the car.

A 40 minute drive from our house, along the obligatory twisting single track roads, saw us parked at the foot of the hill. Stroll it wasn't going to be! Those funny squiggly lines I'd seen on the map were closely packed contours and what lay in front of us was a 35-40 degree slope all the way to the top. Bugger! Double bugger with a hangover! One apparently inevitable biproduct of the ageing process - I've only recently discovered - is the ability to complain about

everything, so in the 30 minutes or so it took me to reach the top, I reckon I'd used about two days worth of moaning and easily a week's quota of bad language. Just as well it's not rationed or I'd have been rendered speechless for the rest of the trip!

However, imagine my disappointment when I eventually caught up with my pals on the summit. Breath-taking scenery, superb flying to be had, and that hangover now completely gone. I couldn't think of a single thing to moan about!

Surveying the scene from around 650 feet above the loch afforded us spectacular views of Kishorn and the Applecross Pass to the north, with TV cop Hamish McBeth's Plockton and the Isle of Skye to the west. The Scottish weather being what it is brought my Spitfire sortie in this stunning location to an end after 30 minutes, when we were hit by a heavy rain shower. Thanks to pals Al Green (static pic) and Jim Livingston (flying pics) for the photos.

I had hoped to fit in a bit more flying as the week progressed, but the breezy conditions brought frequent rain showers and I wasn't prepared to risk ruining either my transmitter or hair style. Also, most of the other useable slopes in this area have little in the way of plant cover, so an EPP model is a must for landing on the bare rock.

The model itself was built from a Cambrian "fun fighter" kit featuring foam veneer wings and conventional balsa/ply fuselage construction, intended for a .25 IC motor, but was easily adapted for the slope. Wingspan is 42" and the completed model was covered in silver Solarfilm and hand painted using Humbrol enamels.

Yes, over the years I've spent many a wonderful break on the west coast of Scotland, but can honestly say that this was one of the nicest places I've ever sobered up in!





# Preview of 7th F3J European Championships Wloclawek, Poland

## *Can Sebastian Feigl do a "David Hobby"?*

Sydney Lenssen, sydney.lenssen@virgin.net

Poland's choice for the seventh European F3J championships is Wloclawek, about halfway between Warsaw and Poznan. The Aero Club at Kruszyń is the furthest north of the FAI championship sites since Lappeenranta in 2002, Finland's world championships, but the weather in August should be hot and thermally. But if other Eurochamps are anything to go by, it won't be too kind all the time.

Poland is a Roman Catholic country and for those pilots who want to do well or better, then they can pray in a 700 year-old Gothic Cathedral and an even older St Vitalis Church. For younger guys and prize-giving celebrations, the old town has discos, drinking and eating houses.

One of the joys of travelling around the world in search of Uncle's gossip is glimpsing how the rest of world enjoys life, and the Polish team has organised a couple of sightseeing cultural tours on the Saturday prior to the banquet, so take advantage of the hospitality.

### What's new?

This year will be the first with a substantial change of rules if you forget about the stake ban which upset the F3J world in the early days. The first two metres of the landing tapes will be divided into 20cm lengths with a graduated scores between 100 and 90. Although Holland and Germany have already tried these landing scores to separate top pilots who can land within a metre of the target in most conditions, this is the first official FAI championship.

One argument for graduated tapes is to persuade pilots to land more slowly without the need to dork or spear their landings so violently. This technique amazes spectators, it's so unreal compared to full-size glider landings, and it has forced fuselage strengthening perhaps unnecessarily. And it is a moot argument. The faster the landing approach, the more responsive the

model is, and the more likely pilots need to brake by piercing the ground.

Dart champions do not throw hard to hit their target. F3J and F3B pilots judge their landing technique usually on the state of the ground around the pin - long rough grass can arrest reliably, hard baked earth is a lottery and we've all seen a top score reduced when the model has slid or even bounced.

Graduated tapes do produce variation between close scores. So far I have not noticed any skilled pilots coming in a second or two earlier to ensure they get closer to the pin. Two aspects of F3J remain big bones of contention: how accurately does the timekeeper start the clock on tow release and how many times is an overfly missed and not penalised. Even the most neutral official timekeeper can be intimidated by the pilot's reputation, and it is his/her decision which counts.

As far as models are concerned, I am told there will be a few new models as



*F3J world champion Benedikt Feigl who will not be flying in Poland, but will be spotting for brother Sebastian, the returning European Champion who defends his title in August in Wloclawek.*

well as the ever-extending tips for established gliders, but I shall leave these for the next gossip column after the event.

### Who is going to fly?

Final list of entries is not 100% certain, but it looks as if 16 countries will take part, all sending full senior teams, with 14 countries having juniors, not always the full three man complement. Sadly the Estonian team was all set to take part until the credit crunch caused withdrawal of their sponsors. Hope to see them in France next year.

BULGARIA has become the most enthusiastic F3J country in Europe, largely due to the ever-growing success of Nikolay Nikolov's NAN Models, and also leading national pilot Sotir

Lazarkov's determination to make an international reputation. They host their Eurotour event in Dupnitsa, a small town 100 km from Sofia with a panoramic flying site, and the hosts make the contest weekend into a festival of fun, the best I've enjoyed this year.

Sotir leads the senior team together with Konstantin Ranov and Valentin Valchev, and I shall cheer for them. I suspect that the junior team will do even better with Georgi Dimitrov, Delyan Todorov and Ivaylo Dimitrov. Favourite for a place in the flyoff among the team is Georgi, but I have hunch that 8-year old Ivaylo might make it, even if his transmitter looks too big to carry.

CROATIA has a full complement and mostly familiar pilots. Milivoj Hucaljuk will be a senior with his son Arijan flying in the junior team. The team is made up by Antun "bear-hug" Sikic who was such a warm host in Osijek and Damir Kmoch who really deserves a big win soon. At Osijek Eurotour this year all the team were beaten by Marin Kordic, who will not be a pilot in Poland, but will be one of the officials at Wloclawek.

Nikola Francic and Marijan Balasko join Arijan Hucaljuk to form the juniors. I am told that Arijan spends most afternoons, Summer, Autumn and Winter, practicing - lucky man, and he demonstrated one second launches in Turkey last year. Incredible 14 minute 59 second flights have been achieved by a handful of pilots, but I hope it never becomes necessary to do this to win contests. It is getting close, and I certainly expect to see two second launches even in the preliminaries.

The CZECHS will be hosting the F3B world championships in the week before F3J, and do not have a long journey to make Wloclawek. Two full teams consist of Jiri Duchan who so nearly became world champion in Turkey, Jaroslav Vostrel of the Samba family who will be taking time off from producing lots of Pike Perfects, and Pavel Kristof. Jakub Lzicar, Jan Lainer and Tomas Kadlec make up the junior team and look certain to give the German juniors a hard time.



No championship would be the same without Janne Savolainen with his sharp comments and wit, but he is not alone this time because Tuomo Kokkonen joins him. I wonder which team FINLAND will link with and I wish them every success.

It is also time for FRANCE to be amongst the winners, with the world champs coming up next year and the strength of F3J in their country. Lionel Fournier will be there as expected, along with Ivan Moquereau and Claude Simonneaud. It's good to see Florian Bocquet amongst the juniors, for it cannot be long before he elevates to a senior, and he is teamed with Robin Galeazzi and Titouan Lelaise.

Team GERMANY have a full force as ever, but with some late changes among the seniors and the team manager. Sad news is that TM Thomas Rossner has stepped aside, but a welcome change brings Reinhard "Lionheart" Vallant to manage the senior team with Christian Reinecke managing the juniors. Reinhard must be the youngest German senior TM ever and it is good to see DAEC, the national aeroclub, going for youth.

Sebastian Feigl, current European F3J champion, will be defending his title as an individual, although he won his place in the team and stood aside to allow Stefan Eder in as fourth in the qualifiers. Sebastian is on a glorious run of wins at this time. He became the new German national champion in Leverkusen last weekend. He triumphed in Belgium's high winds a week earlier, having packed his Xplorers to leave for home only to be told after a check on results that he has made the flyoff, which he then won. He won in Podhorany in the Czech Republic at the beginning of June by less than one point.

Tobias Lammlein also qualified but has had to step down for the champs coincide with college exams in Switzerland. His place goes to fifth in the qualifiers, and that happens to be his father Stephan Lammlein.

Stephan has been a dedicated supporter of F3J from the beginning, serving as junior team manager and stalwart tow man/helper many times. As team pilot extra pressure will be

on, but placings in the Eurotour so far this year indicate that he relishes the challenge.

For Stefan Eder, 2009 is something special. Again he was often a contest winner in the very earliest F3J events all over Europe and flew for Germany at European and World levels. He holds overall responsibility for F3J in the Contest Eurotour circuit. He knows how important to success is a reliable team, for when he took a rest from F3J a few years ago and ventured more into F3B contests, his group became depleted, and on returning to F3J he could not win top spots. Now with his new Satori, Orca and other models he has designed, he's back, a very welcome return.

Notable over several years is that top ranking pilots who decide to take a break away from the stress and travel commitments of competing seriously - it's very real in terms of time, money and dedication to spend every weekend and more for the whole of Spring, Summer and Autumn - but dropping out also means that is difficult to top up performance to catch up with ever-increasing standards of winners.

Third senior for Germany is Karl "the hat" Hinsch, another pilot with a track record stretching back to the birth of F3J. He was the first ever F3J Contest Eurotour winner, many times team member, and last year's team manager. On the trannie sticks again, be warned for he is a pilot who more often than not makes the flyoffs at any level.

Junior team is Johannes Weber again, and newcomers Sebastian Manhardt and Timo Ganser. I met Sebastian in Bulgaria earlier this year, he has been flying for just over one year, coached by Reinhard Vallant. Sebastian was top junior in Bulgaria winning a superbly decorated "RED BULL" Xplorer. I shall be surprised if that model doesn't fly in Wloclawek.

After prolonged efforts, GREAT BRITAIN rarely see juniors flying in the qualifying league, which is very sad. As senior pilots, nobody will be surprised to see Adrian Lee, Austin Guerrier and Colin Paddon again, and they have the same team manager



*Photo 1 Sebastian Manhardt, first placed junior in Dupnitsa, Blugaria, who won the "Red Bull" Xplorer donated by NAN Models, one of the most colourful examples of arty finishes.*

in Graham Wicks backed by stalwart helper Kevin Beale and Graham's son providing the muscle. At the last Europeans in Trnava, this team came fifth, Britain's most successful effort to date, and the same trio are determined to do better. The podium beckons.

Two of the team are believers in having latest models and equipment, with the third being dedicatedly determined to wring the best out of his red and blue models and "comfort-zone" equipment. Austin and Colin have switched to 2.4 GHz equipment, not without some teething problems, Austin with range testing to outdated instructions and Colin losing two

models with intermittent signal failure before the transmitter was replaced by the manufacturer. They will both be flying Xplorers. Adrian's mainstays will be the usual Graphites, but he will have a trick up his sleeve with a Supra wing/Graphite fuz for his still-air standby. Adrian has all but booked his place for France next year and won this year's Interglide. But the remaining team places still beckon.

Last year's world championships will be remembered by ITALY as "Gallizia triumphant" and the family will be back in Poland. But who in the family? I know that Filippo Gallizia will fly as a senior pilot, and he stayed at home last year to take exams, allowing his father to pilot instead. Giovanni who became junior world champion in Turkey is not coming because he start a one year course at an international school in the USA in August. Well done and best of luck!

But Marco and Carlo Gallizia will fly as juniors - they took fourth team place last year - joined by Federico Montanini flying in his first championship.

Francesco Meschia and Alex Galtarossa make up the senior team. The senior pilots we shall all miss are Marco Salvigni and Massimo Verardi who have put family first this year, and Marco Generali who puts university first this time. Father and ex-TM Giuseppe Generali is also staying at home having been in the team for the last six international championships.

Italians bring loud voices, passionate supporters and a spirit of fun and "do-or-die" to events. With a relatively new team, they'll need it to triumph this time.

Sadly LITHUANIA did not make Turkey and have been absent from recent Eurotours, saving their international visits for the Baltic Cup. Poland is next door and full senior and junior teams will be there. Last minute changes to the senior pilots mean that Ricardas Siumbrys, Gintaras Kuckailis and Donatas Pampikas form the same team as in Trnava 2007. They will be flying the new Tragi 801X Cluster, Pike Perfects and Espada R's.





*Photo 1A Defending junior European champion Lelsey van der Laan who will have in mind the idea of gaining his title twice, and that would be no surprise!*

The juniors, competing for the first time, hold their European rivals' reputations in awe, but are determined to match the best. Paulius Vezelis, Lukas Tamulionis and Laurynas Ceskevicius will fly Xplorers, Supras and also Tragis. I hope they surprise us all.



*Photo 2. Jojo "The Diary" Grini from Norway in typical launch mode, making sure that the towmen start two seconds early. (Photo courtesy Nick Kidd)*

No championship would be the same without the NETHERLANDS, and their team will have Peter Smitz, a dedicated helper for both Holland and Great Britain in the past, and for the first time as a pilot this year. Few pilots are experienced as Peter Zweers and Cor De Jong who make up the seniors. All will be managed

by Manfred Wirtz, long time contest director of the Dutch Championships.

Defending junior champion, the ever-smiling Lesley van der Laan and Joeri Buil will make up a short-fall junior team. A pity they don't find a third because the Dutch youngsters always do well and could rival the best with a third score.



I shall miss off-times TM Jos Kleuskens, dedicated spotter of the best restaurants in town, but I'm confident that someone else will have that duty this year too.

Team NORWAY will be led by effervescent and ebullient Jojo Grini who is another pilot running hot recently, winning in North Cyprus, second at Interglide a couple of weeks ago plummeting in Podhorany, flyoff in Turkey!

Senior team also includes Tor Midtlund and Alf Erik Ross, making the same three as in Turkey, but they bring sound common-sense and skills to the team. The Brits stayed at the same hotel with them in Turkey - most enjoyable company as we discussed the disasters of the day. All the Norwegian pilots will take part in the Nordic Championships the weekend before Poland, and success among the 40 pilots expected could give added confidence at the Eurochamps.

Two Norwegian juniors will come to Wloclawek, Stein Marius Pederson together with Frederik Grini, both competing at international FAI level for the first time. Frederik has been to Hollandglide twice with his dad already and knows the F3J scene. As a pilot now, I expect that he won't spend so much time with his computer games in Poland, and wish him good luck.

Host nation for the first time for an FAI F3J championship is POLAND, and although they have organised all sorts of



*Photo 3. 2007 Trnava, Slovakia where the Polish Team competed hard but did not win any trophies. The pressure is on as hosts in Wloclawek and Poland's history as a leading nation in the early days of sailplanes.*

other international model flying contests, this year could be a big test. Poland has a mixed entry record for championships although they sent a full team to Trnava in Slovakia 2007.

Senior team consists of Mieczyslaw Slovik and Wojciech Byrski, both pilots in 2007 when they managed 13th place, together with Miron Geratowski who flew as a junior in Trnava. Wojciech flew to sixth place in the flyoff at Podhorany, one place behind Philip Kolb, so he's a man to watch. Three budding champions from the juniors are Tomasz Frak, Paluch

Mateusz and Dimitry Gashnev. I wonder if anyone will be sporting a Polish-designed model. At most championships there are few neutrals, but those that are will cheer the home team.

For once RUSSIA does not have so far to travel, mind you many of their pilots travel several thousands of kilometres across the country first to get to the border. Russia has two full teams, Andrey Volikov has plenty of international experience now and his hat and tail is famous. Second senior is Dimitry Gashnev who flew as a junior in Turkey, with Aleksandr



Volkov who I believe is new to the contest. All three juniors will be competing for the first time, Vladislav Frunze, Andrey Vechkanov and Alexander Dibrov. Again it will be interesting to see if they have developed a competitive Russian F3J machine.

Not many changes for SLOVAKIA this time, although I have yet to have confirmation that Jaro Muller will be team manager yet again. But I cannot imagine an FAI championship without him, so I bet he'll be there. I am eager to hear his latest news, for gossip has it that he has become semi-retired and concentrating on fewer one-off models. We shall see if golf has finally triumphed.

Senior team as usual, for they were all there in Turkey and Trnava, are Juraj Adamek, Jan Ivancik and Juraj Bartek. Also back again are juniors Jan Littva and Daniel Demecko, but there is one newcomer, Peter Capko.

SLOVENIA doesn't go for big changes either and nobody will be surprised to see Primoz Rizner, Bojan Gegric and Primoz Prhavic making the senior team, backed by Robert Ratiac, Metod Meolic and Jure Marc in the juniors. Primoz Rizner continues to play an important part in the development of NAN's latest creations and flies them competitively wherever he competes.

The mighty TURKS will be in full force in Poland led by TM Serdar Cumbus and an assistant TM Larry "king spotter" Jolly. No need to guess the senior team because it's been the same since they first entered F3J competitions, although I am reliably informed that competition to get into the team gets hotter each year. Pilots are Mustafa Koc, Murat Esibatir and Ilgaz "Doctor" Kalaycioglu. Esra Koc will be cheering us all up and flying juniors again along with Diren Ustundag.

The teams have had training camps at home and have flown in several of the Eurotour contests with success. I am told that all pilots are taking this Eurochamps "very seriously" and want to better the challenge set by themselves at Red Deer, Canada in 2004.

UKRAINE is the last team in alphabetical order, and they have the same senior pilots as in Turkey, Volodymyr Makarov, Dmytro Kharlamov and Alexander Petrenko, with two juniors, Alexander Chekh again and newcomer Artem Parkulab. I expect to see Vladimir Gavrylko as team manager, but I am surprised not to see his son Jury in the juniors, presumably harassed by educational matters.

### Who is going to win?

Now to the bit which regular gossip readers turn to first - who will make the flyoff list, and then win?

My whims and guesses are often guided by recent Eurotour results, not that they are reliable always for even the most competitive contests in the various countries do not have quite the same edge as a true international. This year yet again, Philip Kolb has set a pace which cannot be beaten and scored maximum 103 points in Turkey in April, and in Bulgaria and Croatia in May. So he cannot be other than top unless someone else draws level.

The Contest Eurotour is judged on the top three results from 15 contests. Sebastian Feigl has topped the lists in the Czech Republic and Belgium but without scoring 100 in the preliminaries plus three for the flyoff. So with five contests still to take place at the time of writing, it is still possible for him to draw level with Philip - not beyond his capability - but unlikely.

A more relevant guide is the fact that the Turks have done well wherever they've travelled, and at one point we had Larry Jolly from California in third place after four rounds. Primoz Risner is running close to Philip, and Georgy Dimitrov, the junior from Bulgaria, has excelled so far.

Now to look into the crystal ball for Poland. Assuming that the flyoffs have ten places, my list is Damir Kmoch, Colin Paddon whose season has yet to turn lucky, Sebastian Feigl defending his Eurotitle, Karl Hinsch, Filippo Gallizia eager to keep the family among the winners, Peter Smits as a determined newcomer and outsider, the irrepressible Jo Grini,



*Photo 4 Philip Kolb with his winner's prize donated by NAN Models and now to be auctioned in aid of the Young Lives Foundation. (Photo courtesy of Nick Kidd)*

Juraj Adamek, Primoz Rizner or Prhavic, allowing me one extra guess, and finally Murat Esibatic.

As with last year there will be a prize for whosoever gives me their flyoff list and gets most correct. Either e-mail me or hand me your list before the contest starts. Last year's joint winners, Larry

Jolly and Margaret Pettigrew from Australia, have still to get their prizes, but they treasure the honour.

My favourite to win and become 2009 European Champion is Sebastian Feigl, who would be the first pilot after David Hobby to win two consecutive titles. Coached by his brother Benedikt, they

are hard to beat in any company. My greatest wish is to see that everyone enjoys a happy and fair contest.

### Good cause to support

Philip Kolb's prize for winning the F3J contest in Bulgaria in March was a full carbon NAN Models Xplorer in orange and blue. The same model is being auctioned in aid of the Genc Hayat Young Lives Foundation, a registered charity based in Istanbul, Turkey, which helps young men and women from lowly deprived backgrounds to reach out and improve their own lives and their communities through social and educational work. (Details see [www.genchayat.org](http://www.genchayat.org)) To donate is also to remember how privileged we are to share a sport, not as expensive as many, but far beyond the means of lots of folks.

To win Philip's model you can bid a minimum of £5 or as much as you care to give, the winner donating the maximum amount. Bidding will end at the F3J Eurotour in Bovec, Slovenia in September. Donations can be given to Philip direct at any Eurotour event, and if he comes to Poland. At present he is not supposed to be coming, but can he really resist? If he isn't there, someone else will collect and issue receipts.

Results report next month with luck.





# A LITTLE MORE COMPLETE HISTORY OF RC RADIOS

by Pete Carr WW3O, wb3bqo@yahoo.com

In a previous issue I presented “An Incomplete History of RC Radios.” It was limited by the remaining equipment in hand from several house moves and the passage of time. Bill Kuhlman, fearless *RCSD* Editor, e-mailed that he would like to expand on the theme with some material he had. He offered to send me the equipment to photograph and then I would write the article. I suggested that he take the pictures and e-mail them to me so that the original equipment would be safeguarded from the perils of shipping. He agreed and sent along the marvelous photos that are the basis of this article. Having seen them I mentioned to Bill that he must have inherited the stuff since he was way too young to have used it himself. He replied that, yes, he had bought and used the gear and was not nearly as young as I thought!

## Tubes

Early RC systems were tube radios that used a plate and a filament battery

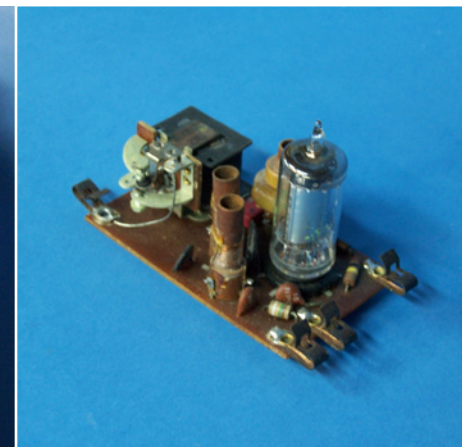
to power them. The plate supply was usually one or more  $67\frac{1}{2}$  Volt batteries and the filament ran at 1.5 Volts. It was normal to use AA-cell batteries with several wired in parallel. This gave the filaments plenty of life while supplying the rather high current required. The filament made the tube glow and gave rise to the statement the “real radios glow in the dark!”

Both transmitters and receivers had this arrangement. The weight of the battery supply made the total weight of the radio a significant percentage of the the aircraft total wing load. I remember buying a group of batteries and soldering up packs for the weekend. The filament battery would drain sooner than the plate supply. These packs would be carefully wrapped in tape and secured in the aircraft with lots of rubber foam (not plastic foam). We always used stranded wire so vibration wouldn’t cause breakage. It did occasionally occur, however, for two reasons. First,

shrink tubing hadn’t been invented yet so we used spaghetti tubing to insulate connections. Second, the heat of the solder iron and solder would change the temper of the wire at the connection so it would fatigue and break over time. Some pilots, those who flew pylon racers and big scale jobs, would apply bathtub caulk to the connections to help prevent breakage.

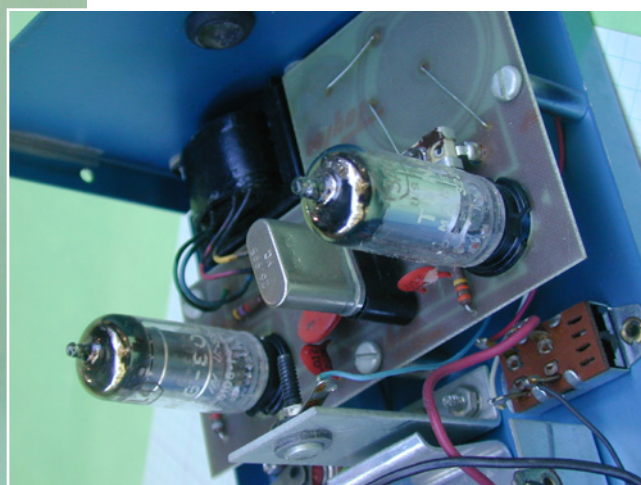
## Single Channel

Single channel was the term used to describe an RC system where a keyed single audio tone was sent from the transmitter to the receiver to actuate a mechanical output. The single channel receivers of the day were either super regenerative or super heterodyne circuits. Regenerative, also called “regen,” receivers, had excellent sensitivity but were not selective and cost less. Super heterodyne, also called “superhet,” receivers had less sensitivity and really good selectivity and were more complex.



Upper left: This is a Babcock model BCT-2 transmitter with companion tube receiver. The transmitter used a small neon lamp to show radiation output.

The receiver had a round connector for on the lower right for wiring to power, the receiver and the actuator. The shaft on the lower left was for tuning the receiver to the transmitter. It was often necessary to retune the system during the flying session as temperature and battery conditions changed. Photos by Jerry Slates



Upper right: This is a Citizenship Model FL single channel transmitter operating on 27.255 MHz which is voice channel 23 of the Citizen band. At the time there was little activity on CB so reliable control was possible. Photos by Jerry Slates  
Left: A CG Venus single channel transmitter. A switch to turn it on and off and a pushbutton to send the signal are the only controls. Inside, two tubes, a crystal and a transformer. Power came from two 67 $\frac{1}{2}$  Volt batteries in series and a D-cell.



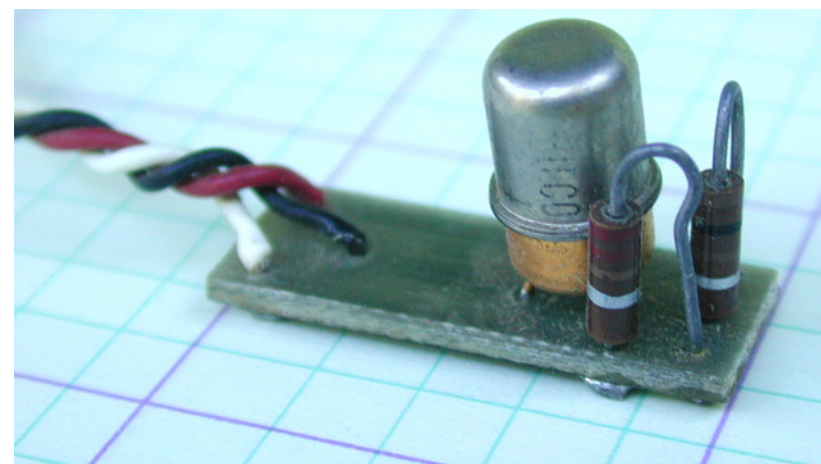


Above: Two large (nearly 6" long) 67 $\frac{1}{2}$  Volt plate batteries on the left. The wire harness at right has two battery holders for the filament AA batteries which were changed often. Photo by Jerry Slates

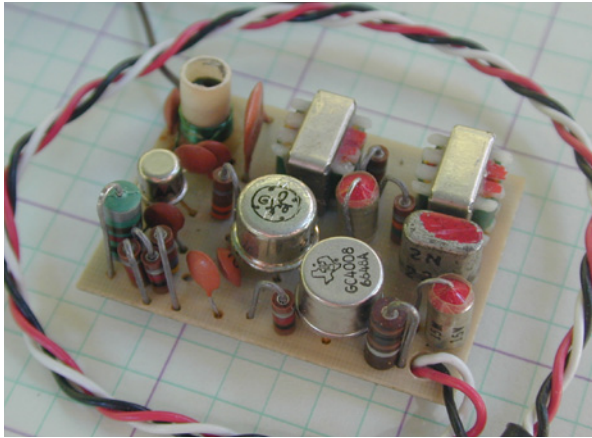
Upper right: A Controilaire transistorized receiver. This ran off two AA cells and was relatively light. Notice the relay at the back corner and the tuning slug at the front corner with access hole in the cover.



Right: An Ace add-on switcher. This component converted 3V receivers to have a single pole double throw action. It required no extra batteries and was used for pulse operations like Galloping Ghost and Simpl-Simul where a magnetic actuator or electric motor was used.

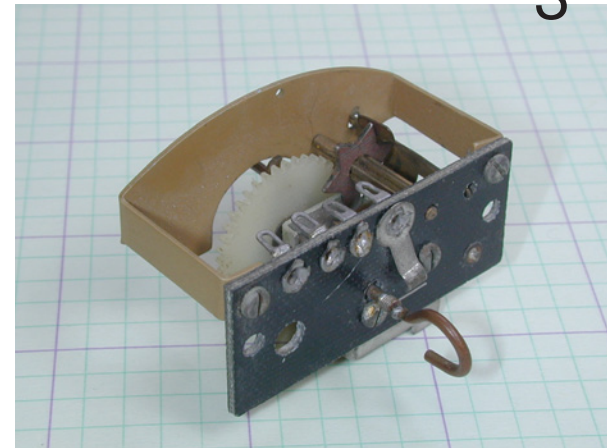
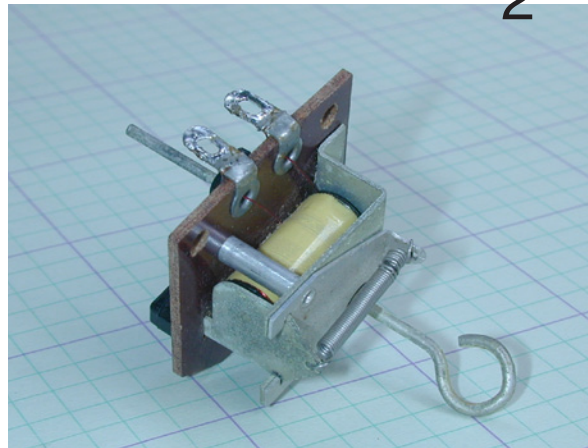
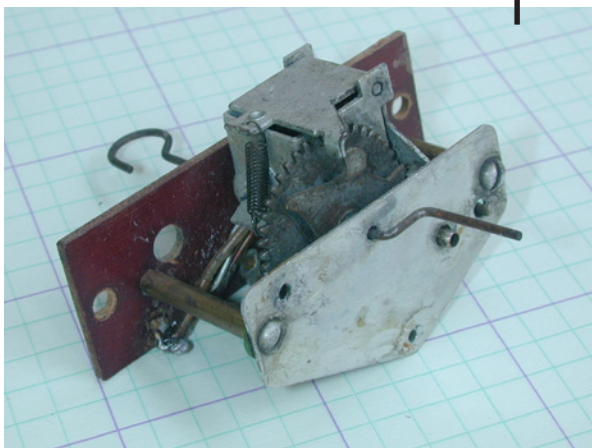
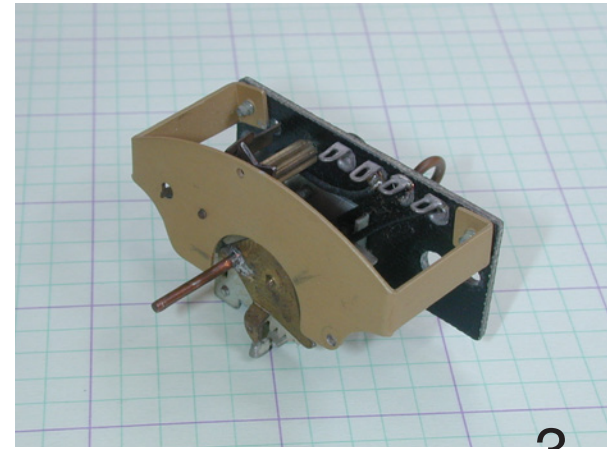
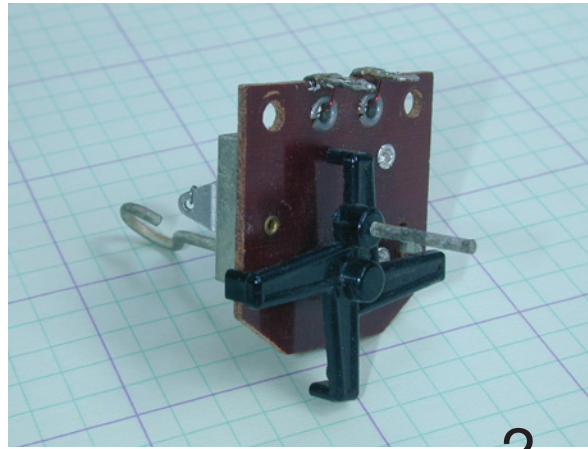
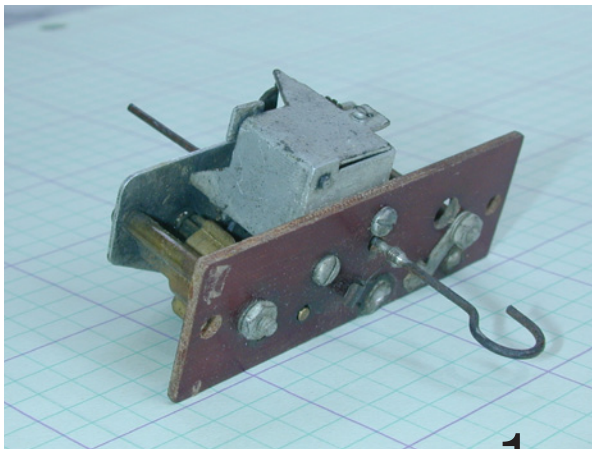




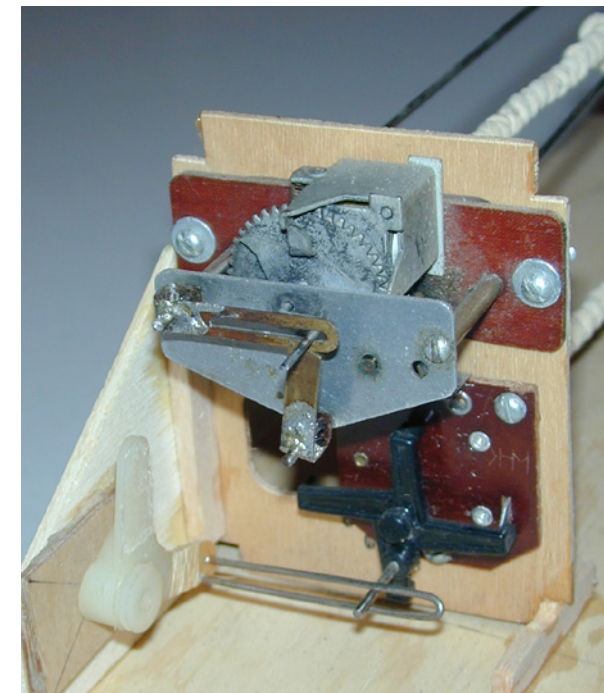
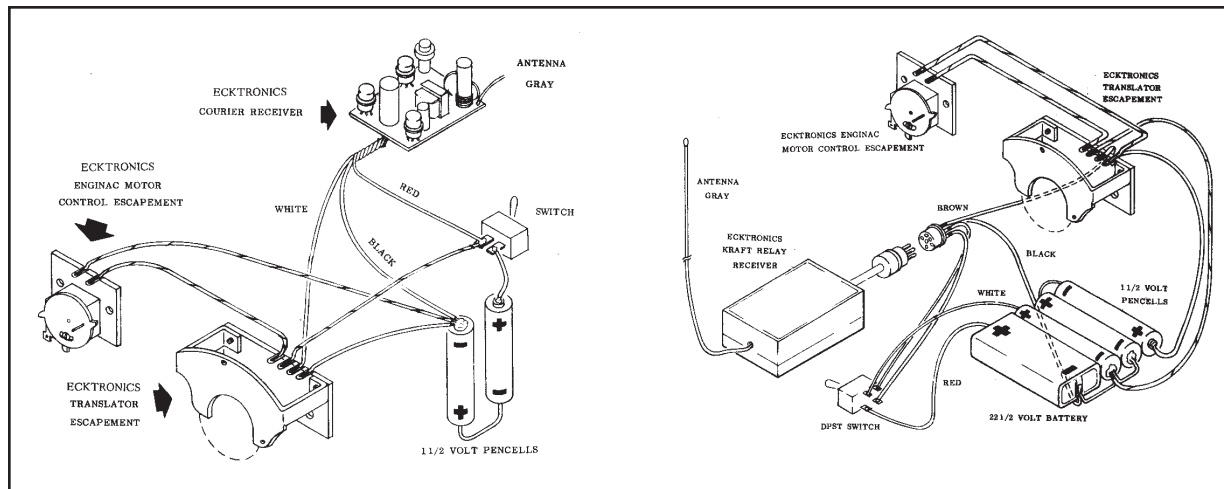


*Far left: A Controaire 5 relayless receiver. Light and all solid state. The tuning coil at the back corner matched the receiver frequency to the transmitter.*

*Left: A Citizenship LT-3 receiver. One of the first transistorized receivers, relayless to save weight. Powered by two AA batteries.*







### Opposite page:

1. A Babcock escapement. As usual, a small solenoid within the escapement pulled a tab away from a pall mounted to the wheel. A second tab on the other end of the rocker arm caught another pall to give right rudder. When power to the solenoid was cut off, the pall was released and the wheel rotated back to neutral.

By appropriate pulsing of the power going to the solenoid, the escapement could be made to hold a second or third pall on the wheel. The second gave left rudder, the third could be hooked to "up" elevator. See the mock-up on this page.

2. This is a Bonner SN escapement. A single tab on the rocker caught and released a tab on each of the four arms - two neutrals and two holdable positions. This could be used in small

aircraft to control rudder (neutral, right, neutral, left, neutral, right...) or to control engine speed. For engine control, the two neutrals were for high and low speeds, and the two other positions were immediately bypassed.

3. An escapement made by Ecktronics. This escapement operates in similar fashion to the Babcock model. Notice the metal tab and the wire whisker in the lower photo. The whisker made contact with the tab before the escapement turned to the right rudder position. If there was no current flowing to the solenoid, current was pulsed to a second escapement (like the Bonner SN) as the whisker swiped the tab. This allowed "quick blip" control of engine speed, each quick blip changing engine speed from high to low or low to high.

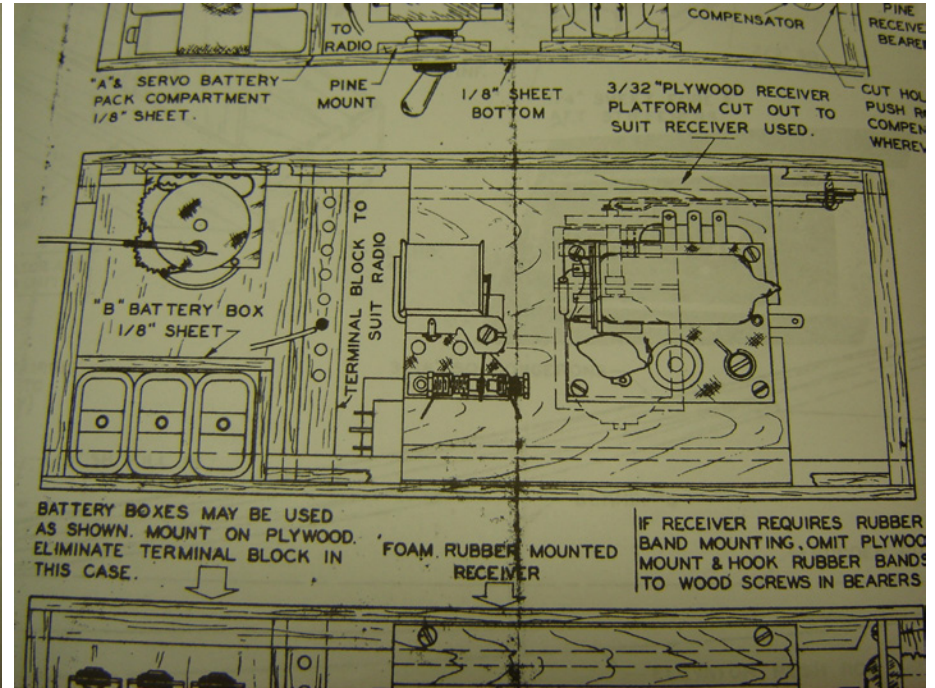
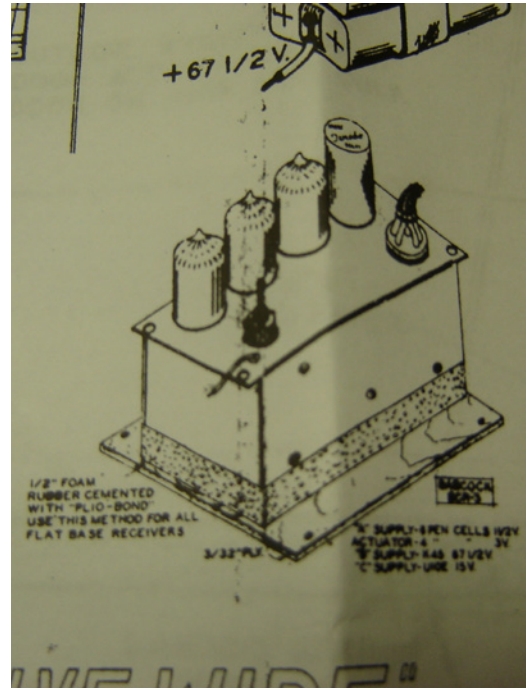
Above left: Wiring diagrams for relayless (left) and relay type (right) receivers. Notice that the relay receiver requires a 22 1/2 Volt battery in addition to AA cells.

Above: A mock-up of a single channel escapement set-up. The Babcock escapement wheel rotates counter-clockwise and is shown in the neutral position. The pin moves the rudder arm upwards (right rudder) then downward (left rudder), lastly bumping the elevator arm (up elevator) before returning to neutral. The "quick blip" system allows the Bonner SN escapement arm to move from the bottom position shown here to the upper position, working the throttle through the bellcrank.



Right: A section of blueprint from a 1955 DeBolt Champ kit illustrating a shock/vibration mount for a 4-tube RC receiver. Vibration would break the thin wire used for the tube filaments causing the radio to fail.

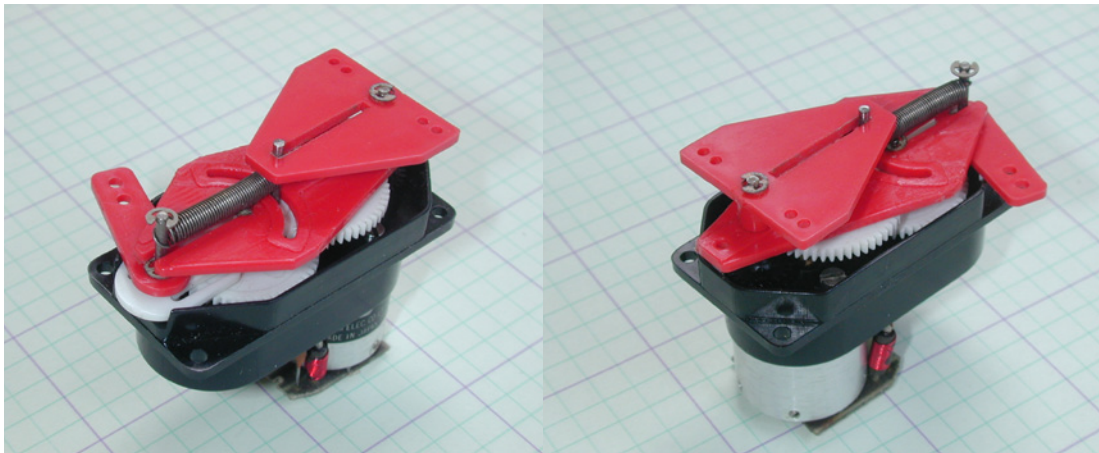
Far right: Another blueprint section from the Champ kit showing a single "hard" tube at right, the relay in the middle and the actuator on the left. Batteries that look like 2U6 9-volt cells are just below the actuator.



Below: Rand Galloping Ghost actuator. For a video demonstration of this servo in action, see <http://www.youtube.com/watch?v=xBSRmIIIGSWQ>.

Below right: DMECO Servo: This is an EBAY ad for a Debolt single channel servo. The servo motor was so weak that a series of plastic gears were used

to give it enough power to move the rudder. A third set of batteries powered the servo.





These receivers took the audio tone from the transmitter and pulled a relay to operate an escapement or servo. This moved the rudder and possibly the elevator or throttle. Many aircraft of the day were of small span, used an .049 engine and were basically free flight designs periodically disturbed by radio signals.

The transmitter had a pushbutton that turned the tone on and off. When the pilot pressed the pushbutton the relay in the aircraft would pull and the escapement or servo would step to the next position. It required hefty math skills to fly a plane in those days. The escapement would give right turn when the relay pulled. If a second tone was sent in rapid succession then the escapement would first go right, then step to left turn. If the aircraft had an engine with a throttle and another escapement, a “quick blip” or third tone pulse would produce neutral rudder and step the motor control from high to medium and finally to low speed position. In flight the net effect of these tones was to watch your plane briefly swing right before turning left. The length of the last tone would determine how much turn you got. Throttle control was usually set up so that you would go from low to high in case you wanted to go around for another landing. (Got all that!)

Dave Garwood writes the Slope Soaring column in *Model Aviation*. In the last

issue he asked for stories about early single channel sailplane experiences. I'll be interested to read these histories of the sport.

I started out in the '60s with a Midwest Li'l T sailplane of about 70 inch span. It was a T-tail design as the name implies. I added a receiver and rudder servo and flew it rudder-only on a slope near town.

The tall grass of the slope saved me a ton of repair time while I figured out the one-for-right and two-for-left steering. I would happily walk down the hill to retrieve the glider and trudge back up to the top to do it all again. There was a road at the bottom of the slope and I finally became skilled enough to fly out over it. I noticed that the Lit'l T would fall more slowly over the road and, on occasion, would actually rise a bit. I took to flying down to the road and then flying up and down it's length until, one day, I actually gained enough height to fly back to the hilltop! I was hooked.

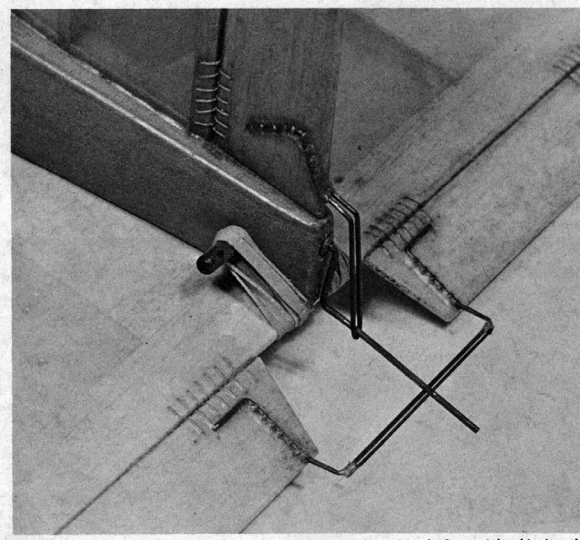
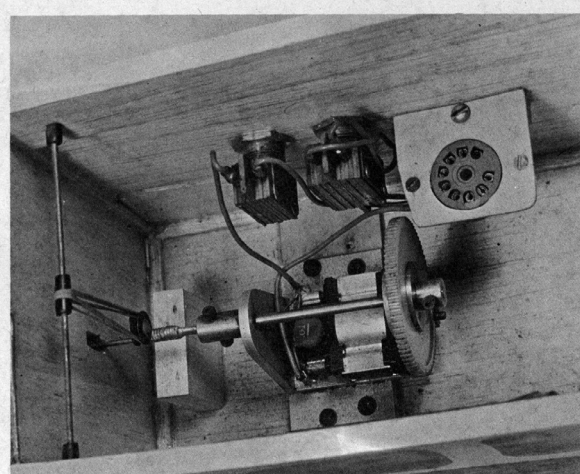
### Gallopig Ghost & Simpl-Simul

The next stage of development was to put a pulse oscillator in transmitters to turn the tone on and off. A control stick was added and it controlled the tone pulse width around a set value called “neutral.” There was even a trim control to set the neutral point! The aircraft had a receiver with an output that switched an actuator in time with the tone pulse width. An actuator would swing its output in time with the pulses and move

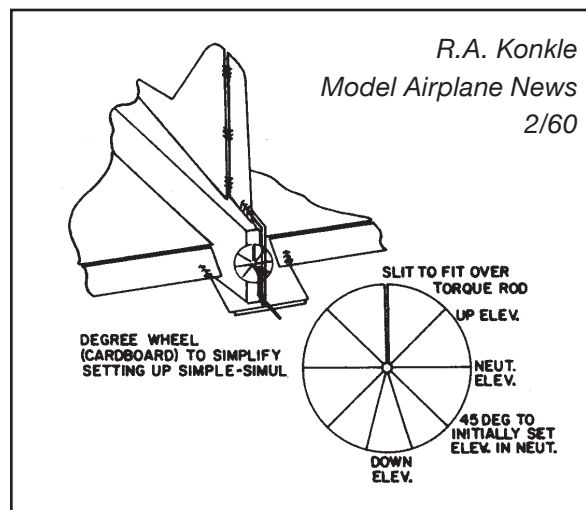
the rudder from full left to full right and back again. If the pulse width changed then the actuator would spend more time in one direction than the other. (By adjusting the rate at which those pulses occurred, the same actuator could be connected to a moveable elevator - down elevator as the rate decreased, up as the rate increased. Some modelers added a worm drive to the actuator to control engine speed. A continuous pulse would run the gear in one direction, no pulse ran the motor and the worm gear in the other direction. The Rand Gallopig Ghost actuator was commercially available. For a video demonstration of this servo in action, see <<http://www.youtube.com/watch?v=xBSRmIIGSWQ>> - Ed.) The rudder and elevator would wildly beat the air causing lots of drag, but it was a form of proportional control. In addition, the battery drain of this arrangement was significant. There remains today a strong interest in perfecting Gallopig Ghost and Simpl-Simul radios because of the improvement in servo technology, stronger motor magnets, and higher capacity, lighter weight airborne batteries.

### Reeds

The next logical step was to change the pitch or frequency of a transmitter tone, then use a reed in the reed bank in the receiver to do the switching. There would be a tone for each control. For example, one tone was for up elevator and another



*Above: A Galloping Ghost set-up using a small permanent magnet motor and rubber band centering. The single torque rod operated both elevator and rudder functions as can be seen in the lower photo. The simple drawing (upper right) illustrates how the two control surfaces were operated. Grid Leaks 1-2/65*



for down elevator. It took two reeds to control a single flight surface.

Neutralizing servos like the Bonner Transmite would go all the way to maximum deflection when the receiver reed heard its correct tone. Since the deflection took some “transit” time, it was possible to keep bumping the transmitter switch and force the servo to partially deflect the control surface. The servo would return to neutral when the reed lost its tone.

Reeds were rugged and simple and had only three problems. The reed was a metallic arm that would resonate at a single frequency. Temperature would change this resonant frequency causing the reed to ignore the correct tone. The second problem was the gap at the tip of the reed. If dirt got into that gap it would prevent circuit controlling the servo from working. The last problem was

vibration from the engine. That would false-trip the reed especially when the engine changed speed. A device called a Lord Mount helped with vibration. It was a plate suspended by rubber bands or foam that supported the receiver. This would (hopefully) isolate the receiver from the engine vibration.

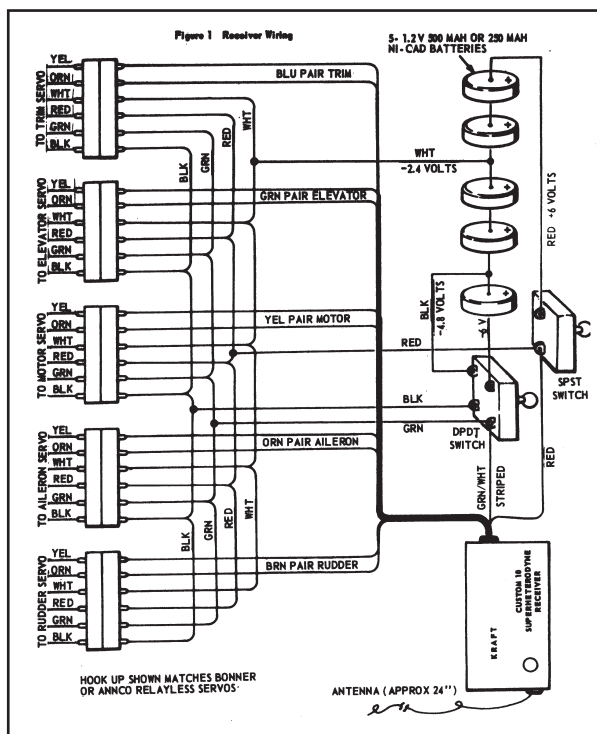
Servos for reed systems were of two types. Aileron, elevator and rudder servos had a neutral position. Throttle and trim (yes, trim) servos could stay at whatever position they last held. There was no in-flight adjustment for neutral so elevator used two servos. One performed the usual up/down function while a second non-neutralizing servo was mechanically connected to the elevator pushrod to adjust flight trim.

You will notice on the picture of the Digimite servo that there is a screw tab where the pushrod connects to the servo arm. That was one way of adjusting pushrod length for trim adjustments on this neutralizing servo. The luxuries of trims on every function that we enjoy on the radios of today were only dreamed about in the time of reeds.

### Living the dream

Many older modelers have bitter-sweet memories of these radios. At the time we may not have known enough about electronics to do a good job or may have tried “shortcuts” that led to crashes. Many of us will remember making an on-field landing with no damage that





*This page: The Kraft Custom 10 superhetrodyne 10-channel reed receiver. Transistorized and relayless. The ten reeds, one per channel, are mounted above a solenoid which is driven at various frequencies. The reeds are each tuned to specific frequency and resonate when that frequency is generated by the solenoid. Because the reeds are capable of being driven by harmonics, all of the frequencies used must be within a single octave, but the solenoid can activate two or more reeds at the same time. The wires coming off the reed assembly denote paired channels - the two brown wires at the near end of the assembly, for example, lead to a single servo (rudder),*

*with one wire connected to run the servo in one direction, while the other runs it in the opposite direction. The servo was self-neutralizing. Adjacent reeds drive a single servo to reduce the possibility that a servo would receive two competing signals at the same time.*

*Despite the sophistication of this receiver, it retained a tuning slug, hence the hole in the upper right of the case.*

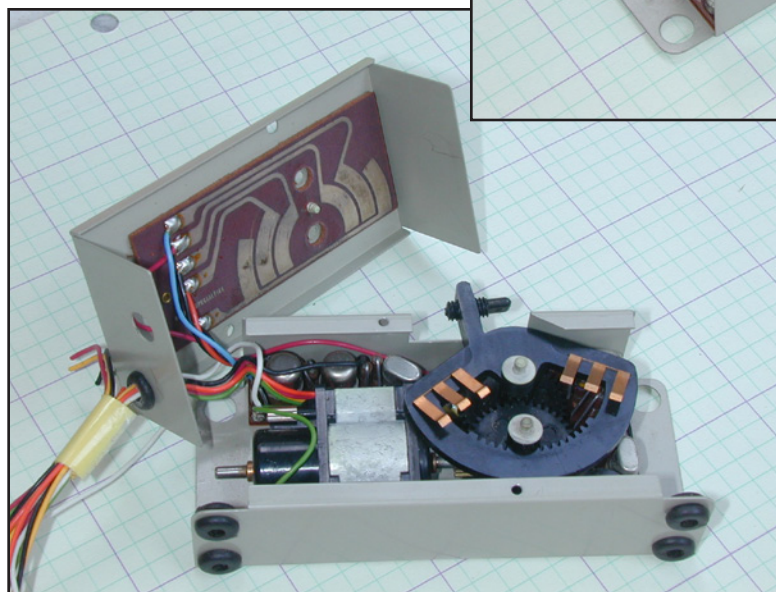
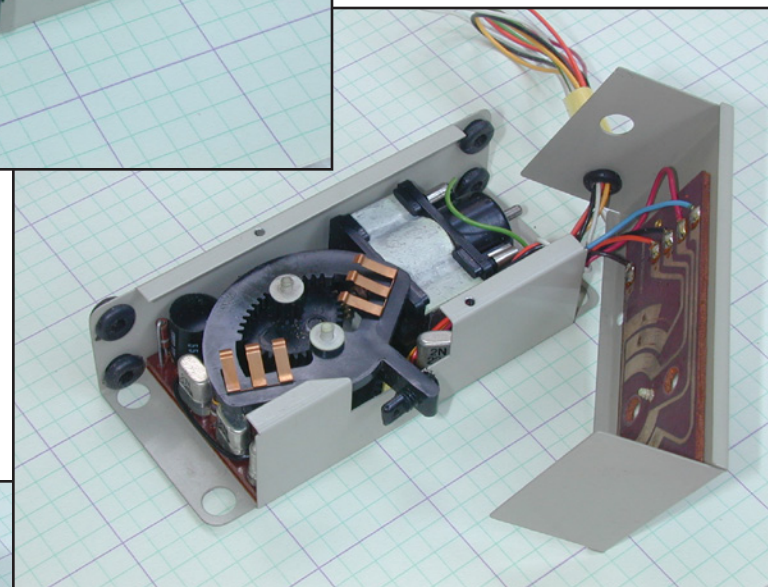
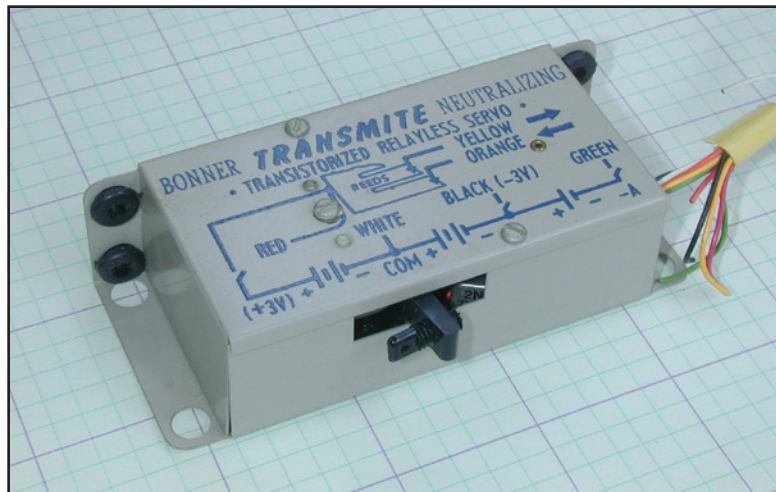
*At the left is the wiring diagram for the Kraft Custom 10. Talk about a complicated wiring harness! The battery supply consists of a 5-cell NiCd battery pack using 250-500 mAh "button" cells.*



was cause to take our spouse to dinner! There were the endless hours of pouring through magazines for information that would make our models perform better and last longer. In short, there was so much to know and not a lot of ways to learn it. It could be frustrating to get a good handle on a type of radio just about the time that a new one came out. For example, I really liked reeds and got comfortable with them. The advent of digital proportional radios was such a big leap in technology that I stayed with reeds for a long time. It was the very small size and weight of digital radios that finally won me over.

Now that we are enjoying the fantastic capabilities of today's radios, there is a part of us that finds something missing. The challenge of building and using the older radios seems to be gone. However, the internet has brought many older modelers together to share ideas and information about old radios. It's now possible to solve those problems that drove us nuts 30 years ago. Many of us have a sense of a "job not fully done" and so are gathering reed sets and single channel gear and reliving the dream.

Yahoo Groups hosts several excellent User Groups that promote information and experience exchanges. They are listed in the Resource Section of this article. There are schematics, photographs, parts lists, sales brochures and a lot of other data about various



*The Bonner Transmite servo, relayless version. Self-neutralizing, but not trimmable. A permanent magnet motor supplies the torque to the gear train. The lug on the arm could be used for "on the ground" adjustments. Notice that the wiring diagram is printed on the servo case.*



radios. The Ace brand is especially well represented from their chargers and test gear to the various radios they produced.

All this information can be a bit overwhelming so it's easy to get lost. The cure for that is to form a question and e-mail the Group for answers. It's also great fun to read the traffic on these Groups for an insight into everyone's projects.

Just as Dave Garwood asked for input on single channel radios for his column, I would appreciate hearing about your experiences with any of the early types of radios. Many *RCSD* readers are located outside the United States and doubtless have worked with equipment made there. I would love to hear about the gear used in Europe, the Southern Hemisphere and Asia. Pictures of these radios systems would be greatly appreciated and will be shared with the readership.

Resources:

Yahoo Groups: ACERC; devoted to Ace RC products.

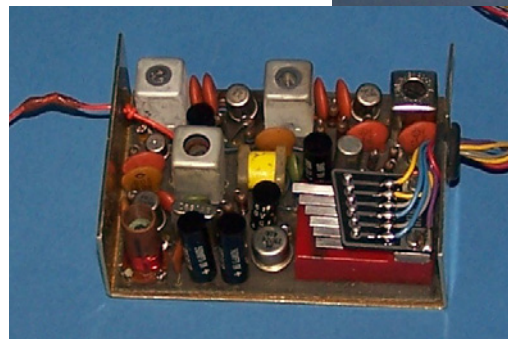
Yahoo Groups: Classic RC; devoted to all the early types of RC radios.

Yahoo Groups: MP8K; devoted to the Ace MicroPro 8000 computer radio.

www.MSTAR2K.com; devoted to the MicroStar 2000 computerized transmitter encoder.



*A Min X Powermite 6-channel transmitter and superheterodyne reed receiver. Transmitter switches are labelled for rudder (right) and engine high and low (upper left). The third switch is not labelled but was used for elevator. All three switches are of the momentary type, so pulsing for partial control surface deflection was possible.*





# My First Radio

Jim Laurel, [jplaurel@spectare.com](mailto:jplaurel@spectare.com)

Here are some shots of my Series Seventy-Seven Kraft KPT-5C, circa 1977. The Kraft was my first radio when I started in the hobby in that year. This radio was purchased from Tower Hobbies and shipped via the APO system to Zaragoza Air Base in Spain, where we were stationed at the time. My Dad was a US Air Force flight surgeon.

I bought this radio with money earned from my summer job working at the base photo lab. There were no 800 numbers or internet in those days. I handed cash to my Mom, who wrote a check to Tower Hobbies, which I enclosed with my carefully filled out order form. Orders took around one month to arrive from the time you mailed the order.

The first plane this went into was an Airtronics "Square Soar," followed by a handsome Astro Flight AS-W15. In those days, before digital trims, you had to take care to build your linkages with precision. I think the old radios like these taught us good building and setup habits that are still beneficial even with today's computerized transmitters.

As you can see, the servos and equipment are just huge. It's hard to believe that we stuffed this huge gear in those little two meter planes and actually flew them in thermals!

The fifth channel on this radio is controlled by a switch on the upper left of the transmitter case, which we would generally use for retracts.





# I wanted one & I got one!

Jerry Slates, oldjer1@att.net

## ***In the Beginning...***

In 1947 at the age of 11 I went to and entered my first model airplane contest, a PAA Cargo and Free Flight contest at Camp Beale, a partially decommissioned Army Air Corps base in Marysville, California.

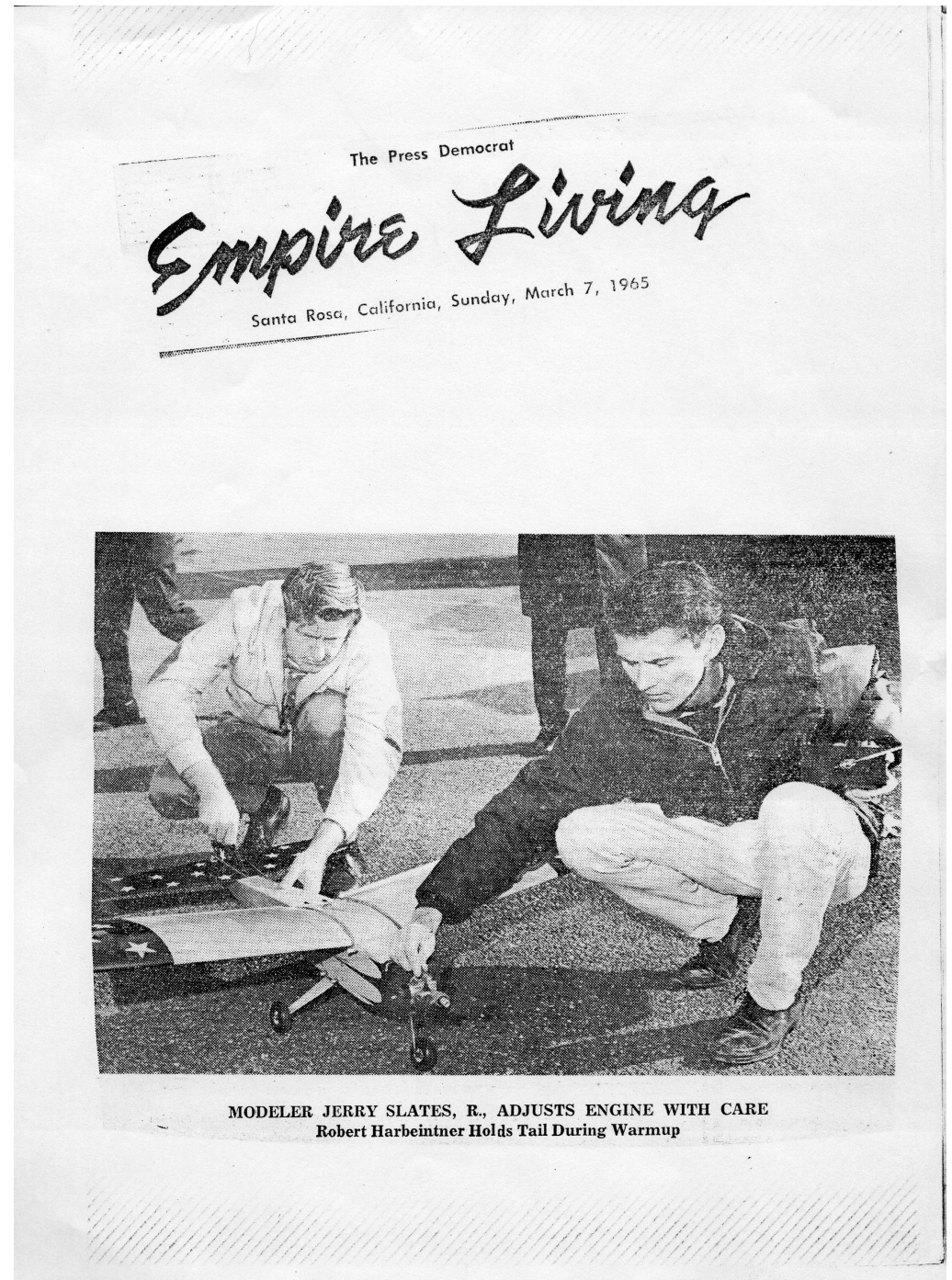
During the noon lunch break of the contest there was to be a radio control demonstration. As a young boy this was something that I just had to see. At this time I had only read about radio control model airplanes in magazines and had never seen one.

A little before noon I wandered over to where there were two gentlemen preparing to set up their radio control equipment and models. This young boy found a spot in front of their cars where I could sit and watch everything. I didn't want to miss anything. I sat there watching everything that they did for what seemed like hours. As they began to unload their cars, I was amazed at all the equipment that was required to fly radio control model airplanes.

---

*The author, upgraded to his first multi-channel, reed relayless radio system — the "Black Box of Orbit."*

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MODELER JERRY SLATES, R., ADJUSTS ENGINE WITH CARE  
Robert Harbeintner Holds Tail During Warmup

There were tool boxes, battery boxes, transmitter boxes, control boxes, antennas and cables.

As these two gentlemen began to assemble their equipment, they started by putting together the ten to twelve foot tall antennas that mounted onto the transmitter boxes that sat on the ground. Next to the transmitter boxes sat their battery boxes. Cables were used to connect the battery boxes to the transmitter boxes, and another cable was used to connect the transmitter boxes to the hand held control boxes. Now it was time to tune and test the transmitters. It only took a few minutes to tune and test the transmitters, but it seemed like it took forever.

Next they removed their models from the cars. The models were Class II, that's rudder and elevator with motor control. The first thing that they did was to install new fresh dry cell batteries into the model radio receivers. Keep in mind that this is before NiCd and rechargeable batteries. They then tuned and tested the receivers. This too seemed like it took forever, but again it was only a couple of minutes.

#### READY TO FLY

The first gentleman started his motor and tested the rudder and elevator controls and was ready to fly. The model was pointed into the wind and took off. The model then flew straight for maybe 100 yards or so and then turned to the right.

Again the model flew straight and made another turn to the right and was coming back my way.

Boy, was I impressed!

Then the model rolled over and then crashed for what appeared to be for no reason. This 11 year old boy was impressed and then disappointed.

The second gentleman now readied his model and was prepared to fly. He started his motor, checked the controls, and pointed his model into the wind and took off. The takeoff was perfect and the climb out was smooth and straight. He went upwind and made his first turn and I took a deep breath. He made a couple more turns and did a fly-by and went downwind. He then did a 180 and was coming back. The motor was throttled back to low speed and the airplane landed about a 100 feet away, and then I started breathing again.

WOW!

Boy, was this 11 year old kid impressed again! I knew then and there that I wanted one!

Now at this time I couldn't tell you what kind of equipment that these two gentlemen were using. It could have been home made ("ham" operators), or maybe something commercial, from over the counter, or war surplus? There were a lot of war surplus stores around at this time, after World War I, where you could

buy almost anything, from mess-kits to half-tracks and radios.

#### TIME PASSED

Eleven years later I found myself working for ATT. Would you believe that the office that I reported to here in Santa Rosa, Clifornia, had a group of radio control model flyers and a group of radio control model boaters. It took me almost a week to work my way into the radio control flying group and find my way out to their flying field, Cal Kim's Dairy Farm.

My first weekend out at the flying field I had to check out the equipment that everyone was using. I knew very little of radio control equipment. I saw a couple of home-made set-ups, made by ham radio operators, ready-made equipment like Babcock, Citizenship, and Orbit, and some miscellaneous stuff and a couple of W.A.G. systems. All systems were single channel at this time.

#### I GOT ONE

After a couple of weeks I was ready to get my feet wet and purchase my first radio system. I was leaning towards the single channel Orbit. Because there was no hobby shop here in Santa Rosa (and there still isn't) I had to mail order or drive the 50 miles into a San Francisco hobby shop. As luck would have it, the San Francisco hobby shop had the Orbit system that I was looking for.



## THE WINDS OF CHANGE

### *Hard Tubes, Peanut Tubes and Transistors*

As most of you know, in the mid-50's through to today the electronics and computer field is ever changing, and radio control equipment was no exception.

My new Orbit radio system was updated with a new "peanut tube" in the receiver instead of the old larger, "hard tube."

What is the difference you ask?

That hard tube required two 67.5 Volt batteries that weighed in at 16 oz. That's right, one pound of batteries. The newer radio receivers with the peanut tube required one very small 30 Volt battery that weighed about two ounces. Also, these newer radio receivers were relayless. The relays were replaced by Flip/Flops, a transistor circuit, and this was also another weight savings.

### AIRBORN PACKAGE

Some of these early radio receivers were a bit heavy by today's standards. With a one or two or three hard tube radio receiver, and A, B & C batteries, plugs and jacks, two switches, a 'phone jack for testing, and escapement with two more escapement batteries, you could have an airborne package somewhere around 24 - 30 oz.

With the advent of the transistor, these newer radio systems could reduce the weight of the air born package to about 6 - 10 oz., give or take a little.

### THE ESCAPEMENT

What is the escapement? Some of you younger flyers may have not ever heard the word escapement, let alone ever seen one. So what is it?

The escapement is kind of a clockworks device that is used to operate the control surfaces and motor control on your model.

Let me confuse you some more.

The escapement in the photo has a cam that rotates to move the control surfaces of your model, and is powered by a wound up rubber band. But to operate the escapement there is an electric solenoid operated by the radio receiver.

Let's move along.

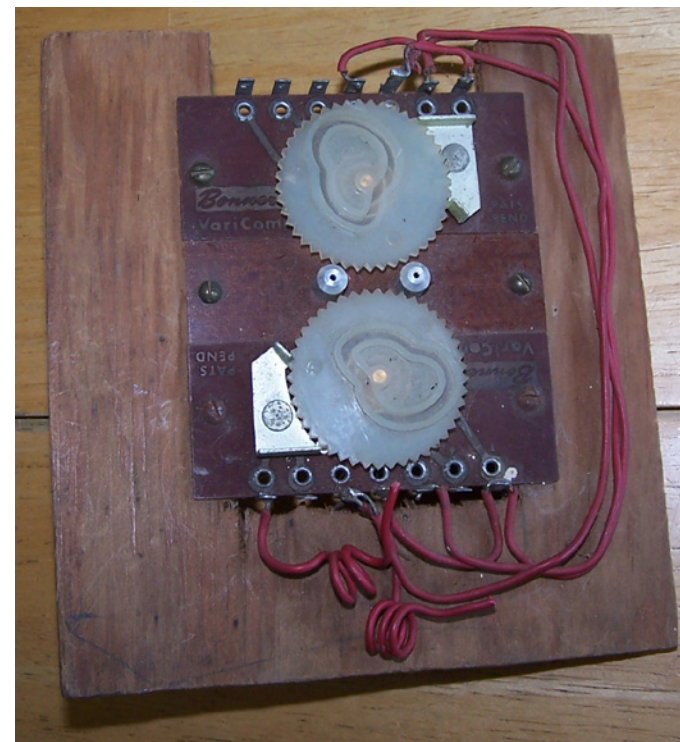
### LETS FLY SOME

#### *Timing is everything*

Class I, rudder only with motor control.

We are flying along, and let's make a turn to the right. Push the transmitter button once and hold it down.

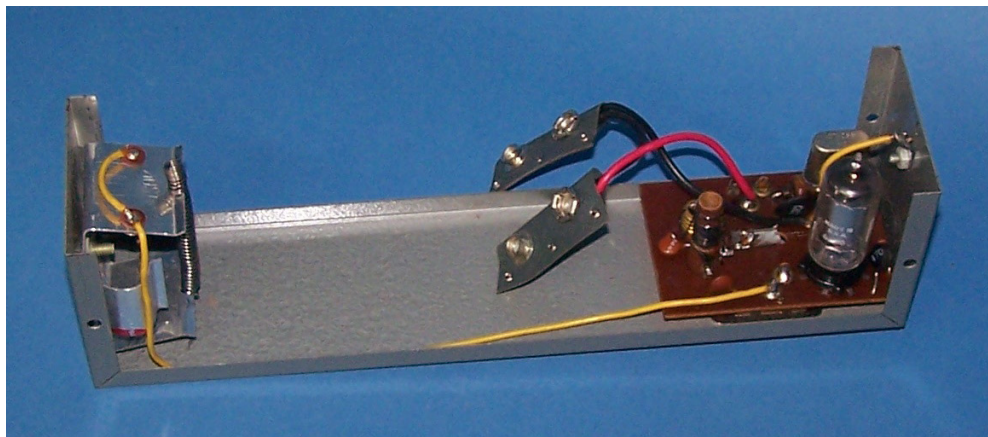
What happens is...



*Two Bonner VariComb escapements wired to operate two control surfaces. Torque wires to the control surfaces came through the two bearings located between the cam wheels. Guide pins attached to the torque wires rode in the cam channels. The teeth around the cam wheel ran against the metal rocker to slow the rotation speed to a reasonable rate.*

*A Citizenship brochure and two vintage ads have been scanned and compiled by the author and are available for downloading in a single ZIPped file at <<http://www.rcsoaringdigest.com/images/SlatesScans.zip>>*





**NOW! NEW KRAFT SIMUL 10 TRANSISTOR TRANSMITTER.**  
ON A CUSTOM BASIS ONLY-ORDER EARLY!

THIS LITTLE PACKAGE packs a POTENT WALLOP; Much more than you'd expect from something this small. EXTENSIVELY TESTED under actual flight conditions, this small unit packs more punch than the vacuum tube version. This is due to a very efficient design, which allows the ultimate from every component. Especially graded and selected transistors by Philco make this dream transmitter a reality. Imagine a package only 6 1/4 x 3 x 6, weighing only 3 pounds 12 ounces, giving ten channels simultaneous operation from an inexpensive 9 volt battery outperforming almost all vacuum tube types! Center loading of the antenna makes the 26 ma at 9 volts punch into the air the signal you need to override interference.

Available on a custom built basis only. Each unit checked out under personal supervision of PHIL KRAFT—GUARANTEED to meet his specs—or IT IS NOT SHIPPED. We urge you to get your orders in for these custom built jobs. This KITTx10M, designed for the KRAFT CUSTOM SUPERHETS with the Medco reed bank cps, will be THE R/C MULTI TRANSMITTER SENSATION OF 62. Drop shipped from California—deliveries in turn after placement of order. Price is only \$118.50! Order KITTx10M.

This unit will not be offered in a kit form until 1963. Circuit is copyrighted and will not be published until kit is available.

NOTE—This unit does not obsolete the present 10 channel Kraft Triple Kit, which will continue to be available for both the Deans and Medco Reed Banks. But, good news! Due to quantity purchasing, we have been able to reduce the price . . .

NOW ONLY \$87.50. Order KT10K-D or KT10K-M for either Deans or Medco reed bank use. Available in 26.995, 27.145 or 27.255 frequency. Please specify.

## ★ MULTIMASTER 10 TRANSMITTER

With more power output than any other hand-held unit available, the Min-X Multimaster 10 channel transmitter is designed to match our Superhet Multi receiver. This is the unique transmitter featuring the "removable pot boxes" — which enable you to have a pot box tuned to a different receiver. Changing from one receiver to another is carried out by simply plugging in a different pot box (without the need for retuning). The Multimaster is 100% tone modulated; has a reliable MOPA circuit; lever switch operation and is certified to meet all FCC specifications. The chromed antenna has an amphenol type connector — as well as being both removable and telescopic.

SIZE:  
3-1/2 x 8 x 10

WEIGHT:  
3-1/2 POUNDS



Upper left: The "insides" of a Citizenship Model FL transmitter. This unit required two 67.5V batteries in series and two 1.5V batteries in parallel in the holder at the base. A single tube and crystal were the major components.

Above: A Min X ten channel transmitter, circa 1962. Note the ganged on-off switches and lack of switch labeling. \$115.95 The accompanying superheterodyne Min X reed receiver ran off 6V and cost \$89.95

Left: The Kraft Custom 10 transistorized transmitter, circa 1962. This 10-channel transmitter could control five servos in the aircraft. The toggle switches are of the self-centering 3-position type. The upper left switch is for motor speed control, the elevator switch is below, with the switch offset toward right being for elevator trim. The top right switch is dedicated to aileron, rudder below. \$118.50



Was radio control equipment expensive back in the '50s & '60s?

Yes, I'm afraid so.

The minimum wage was \$0.35 per hour.

A single channel set-up would run you about \$100.00 - \$150.00, plus batteries.

A multi-channel reed transmitter and receiver, plus servos (servos were normally sold separately), plugs, jacks and switch would be around \$400.00, plus batteries.

The wiring harness - plugs, jacks and switches - had to be soldered together on your own with a circuit diagram as a guide.

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Class I — Rudder only with motor control.

Class II — Rudder, elevator and motor control.

Class III — Rudder, elevator, aileron and motor control (Full House)

The escapement solenoid is released. The escapement cam now rotates 90 degrees, powered by the rubber band, and stops. This action has moved the rudder to the right.

To stop the right turn, you just release the transmitter button.

This action again releases the solenoid and the escapement cam rotates, powered by the rubber band, moving the rudder from right, to neutral, to left and back to neutral, and the cam is stopped by the solenoid back where it started.

Note - This right, neutral, left, neutral action is fast enough not to effect the flight path.

To do a left turn.

Again, push the transmitter button once and release before the escapement stops at 90 degrees and then push it again and hold.

This action again releases the solenoid and the escapement cam rotates, powered by the rubber band, and stops at 270 degrees, moving the rudder to the right, then neutral, and then to the left and stops.

To stop the left turn, just release the transmitter button. The solenoid operates, releasing the cam, powered by the rubber band, moving the rudder back to neutral.

## MOTOR CONTROL

### *The Quick Blip*

To operate the motor control from high speed to low speed, we will do what is called a, "Quick-Blip." That is to push the transmitter button down and release it as fast as you can.

On the Bonner escapement, this action again will release the solenoid and the escapement cam will rotate, powered by the rubber band, about 363 degrees and stop, moving the rudder to the right, then neutral, then to the left and back to neutral. In this position a second motor control escapement will operate, releasing its solenoid and, powered also by a rubber band, change the motor speed from high speed to low speed, followed by the first escapement moving its last two degrees to its normal neutral position.

To move from low speed back to high speed again, just do another "Quick Blip."

### IT'S ALL IN THE TIMING.

As you can see, you have got to learn to work your thumb at the correct speed. It's all in the timing. Otherwise you will be doing a lot of button pushing, wandering all over the sky and not really having control of your model.

Believe it or not, this is how a lot of us "old timers" started flying radio control model airplanes.



# TailWind Gliders.com

NEW!

## Sailplane Calc Now Available in Metric!

It is my pleasure to announce that with the help of Jaap Braam that all of my spreadsheets are now available in metric! There are different downloads, one for the metric version and one for the original decimal version.

The original "Sailplane Calc" and "V-Tail Calc" have been updated as there was an error in Spiral Stability calculation on the Tail Sizing Checks tab. Thanks to A. Todd Jurhs for finding this error.

Thanks to *RCSD* for publishing my "Sailplane Calc" tutorial in the April 2008 Issue.

## Flying Wing Calc Now Available for Multi-Taper Wings

This spreadsheet uses the late Dr. Panknin's formulas for calculating the required wing twist for a non-plank planform, originally only for a single taper wing and now available for up to three different tapers. I have not built or flown a model with more than one taper using this new spreadsheet, so am looking for feedback from users.

## New Web Site

I now have a dedicated website for all my contributions to the modeling community. Please visit the new website for the most current updates: <<http://www.TailwindGliders.com>>



*We've decided to publish AUFWIND-english in response to the wishes of many readers in USA, Australia, Great Britain, and eastern Europe. Most already have read AUFWIND, but, not knowing German, were more or less limited to viewing the photos.*

*AUFWIND-english is a complete and legible translation of the German version, and will be published as an addition to the German version. Dieter Mahlein of ShredAir <<http://www.shredair.com>> is in charge of translating AUFWIND.*

*AUFWIND-english is issued six times per year, always during the last week of February, April, June, August, October, and December. The subscription includes a printed and bound copy of all translated text, but not the photos and charts accompanying the articles. AUFWIND-english will not be issued as a PDF file.*

*The premier edition of AUFWIND-english will be released on December 21, 2009 as issue number 1/2010.*

*Anyone who signs up for a 1-year subscription to AUFWIND-english by October 15, will receive for free issue 6/2009 which will be sent out on October 26, 2009; the subscription still start with issue 1/2010. The same holds for the German version of AUFWIND.*

*The German issue of AUFWIND is on the internet at <<http://www.AUFWIND-magazin.de>>.*



On the 'Wing...

# WINDLORD XC

Ken Bates' Standard Class 'wing gains ailerons and is enlarged to 128"

Bill & Bunny Kuhlman, bsquared@themacisp.net

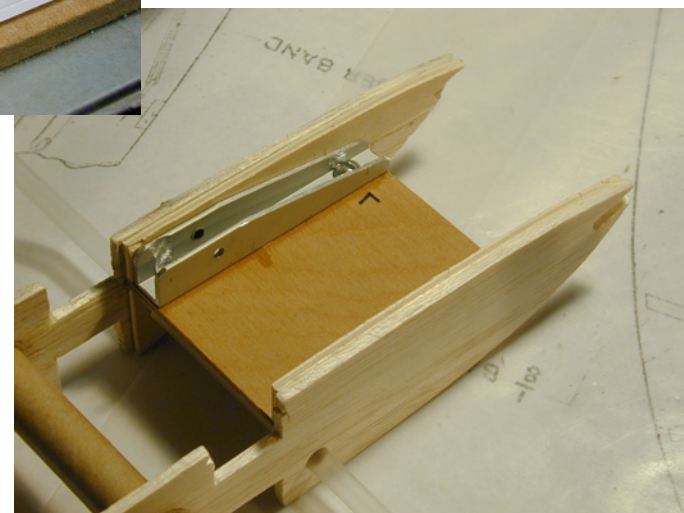
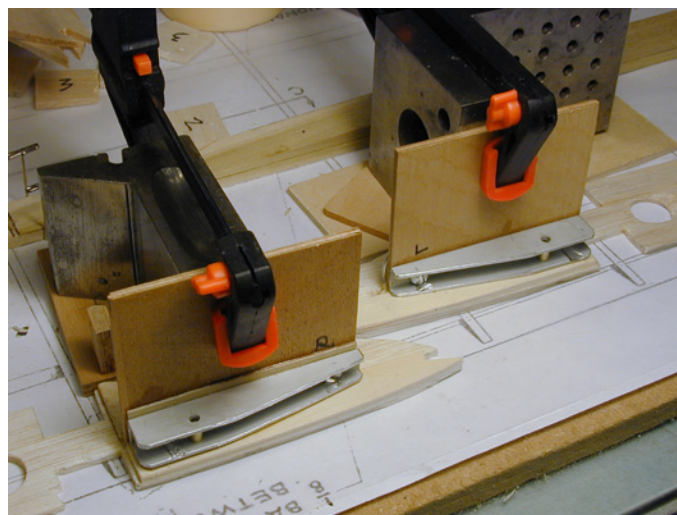
It doesn't appear that much progress has been made on the Windlord XC over the last four weeks, but we're still in the process of making parts for both wings while concentrating on getting one wing finished.

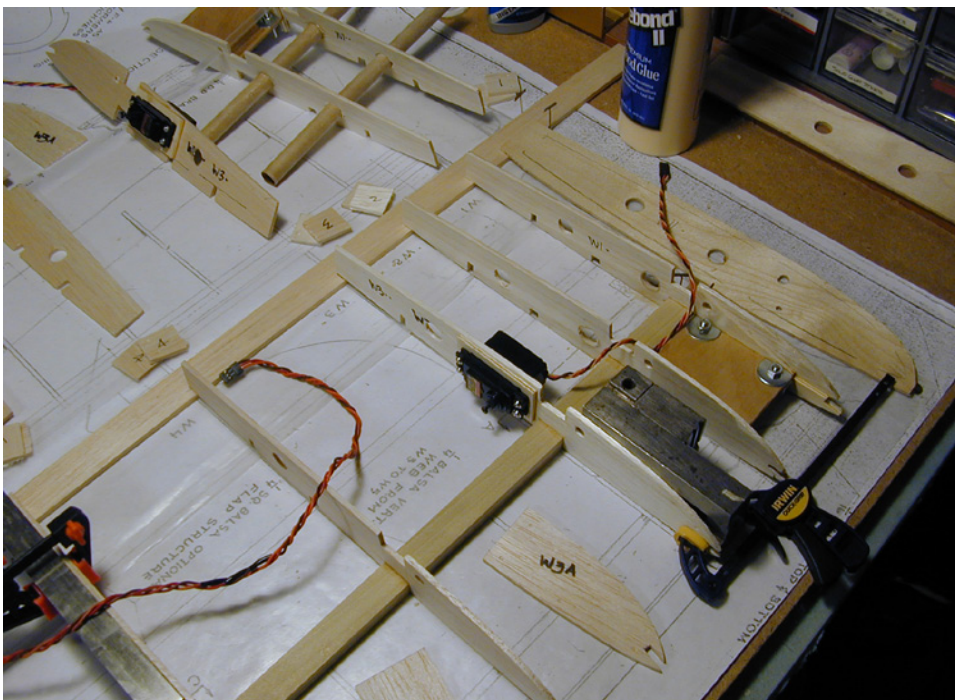
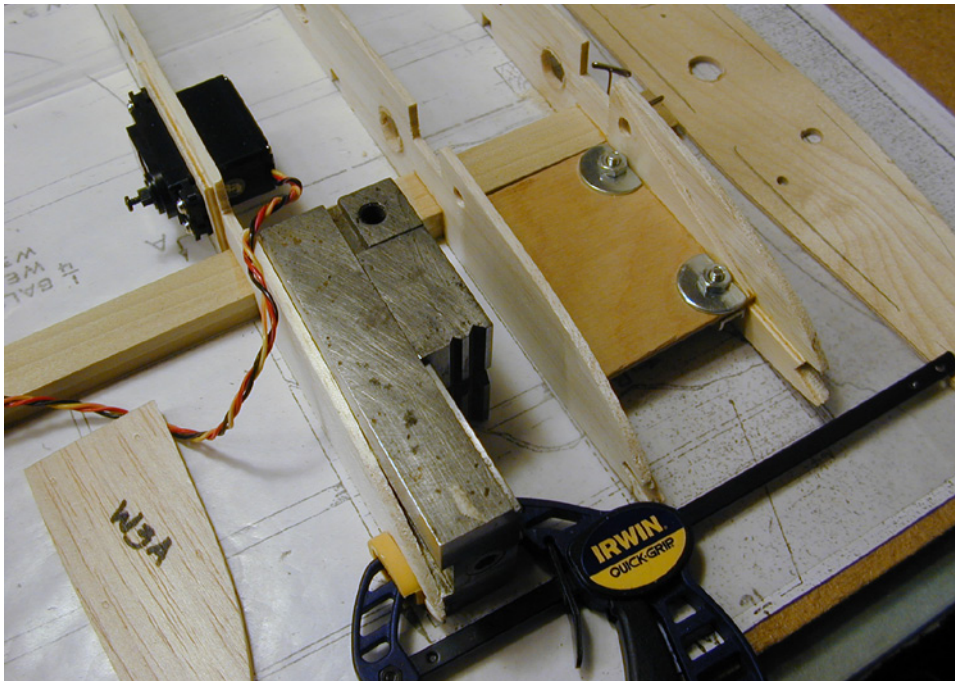
We built the releasable tow hook assemblies and have one completed unit mounted in the left wing, currently under construction.

The releasable tow hooks are simply aluminum channels with a retractable music wire pin holding the tow ring. The channel is bolted to a plywood panel supported by plywood reinforcements bonded to the wing ribs.

The plywood support, with the channel bolted on, was first glued onto the root rib using 30 minute epoxy while held in position with machinist blocks and clamps.

Once the epoxy hardened, the plywood was glued to the support on Rib 2, again





using epoxy. This part of the assembly was accomplished while both ribs were on the main spar and properly aligned in relation to each other. Once the spar is installed, additional support will be added. A drawing of the completed releasable tow hook assembly and installation appeared in the July issue of *RCSD*.

Wing construction started with drilling holes in appropriate locations for the cable routing from each servo to the wing root. By drilling a hole in one rib and using that rib as a pattern, the drill press and Forstner bits made quick work of the process.

All of the ribs were then glued to the lower spar, holding them in place with machinist blocks and clamps. With the ribs still in place, the full span secondary spar was glued onto the the ribs and the short rib pieces between the secondary spar and the elevator spar were glued into place while being careful to get correct alignment. The elevator spar was then glued into place as well.

With the framework made sturdy, the cable conduits and leading edge were glued in. Now it's on to building the control surfaces!

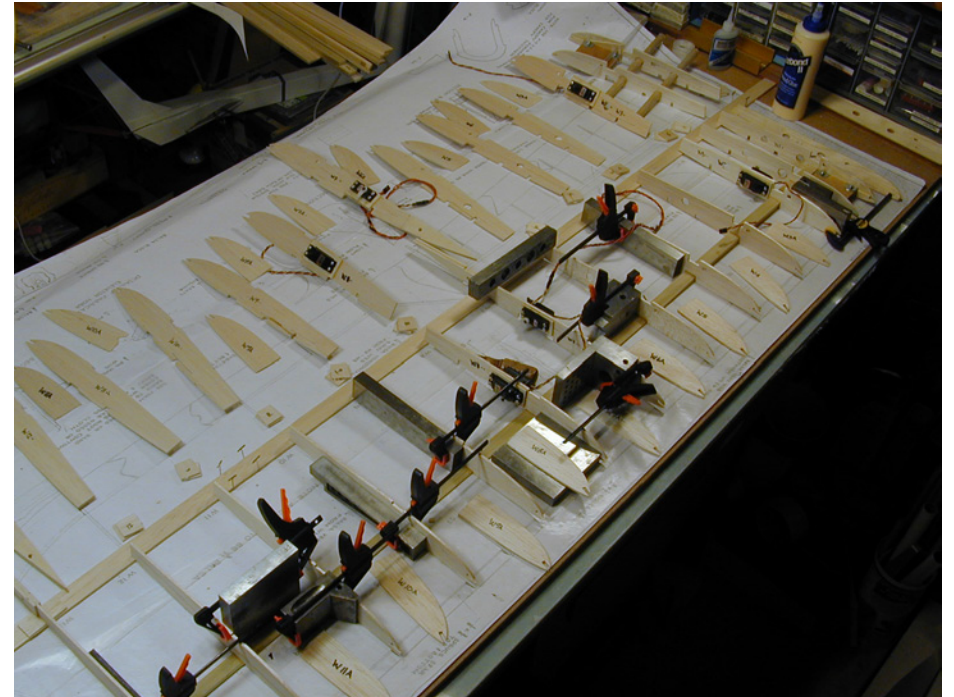
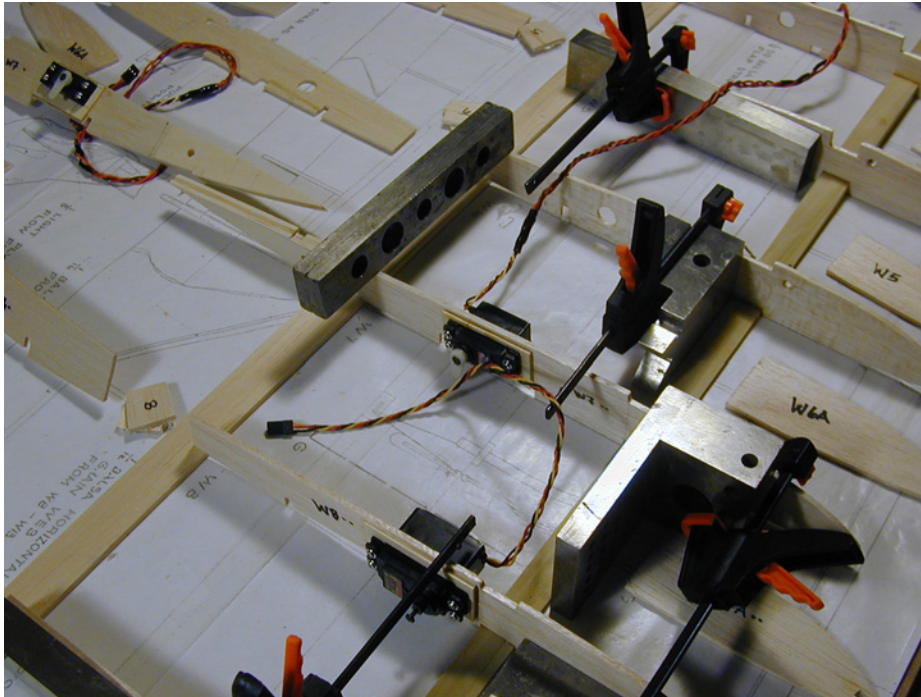
On another front, we've cut out the template needed for the leading edge of the fin and the template for the plywood fuselage sides.

So, slow but steady progress with the goal of flying before the end of summer still in sight.

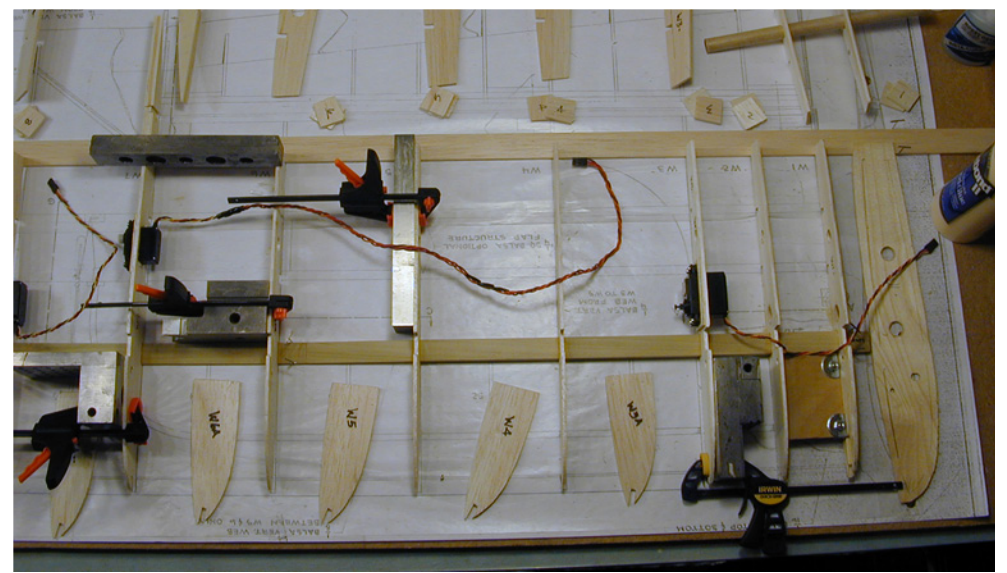
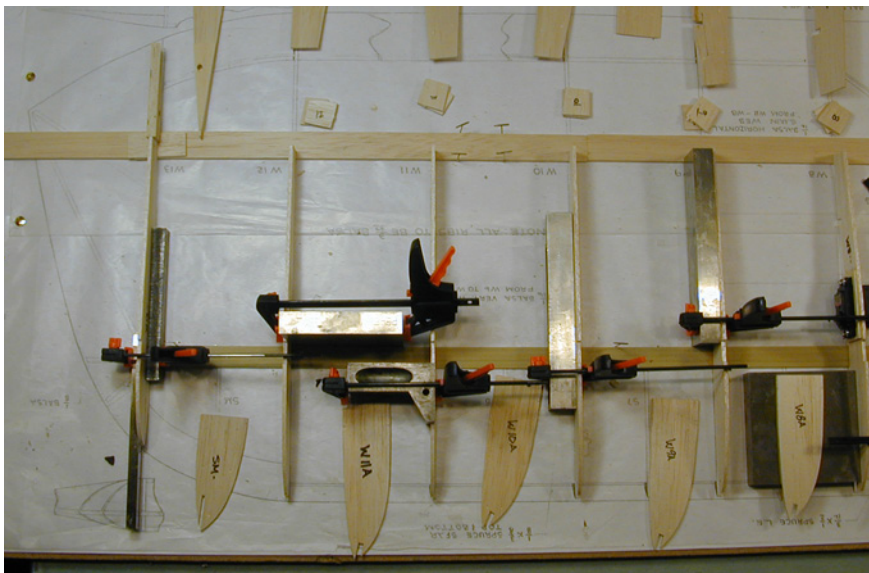


Opposite page: Combined photos show the entire right wing under construction. Releasable tow hook is on the right of the photo, mounted between Ribs 1 and 2. The full span spar is not yet in place. The tip rib requires 1/8" washout, hence the additional balsa block on top of the main fixture.





Above: Detail photo showing the aileron servo (closest to the camera) and flap servo mountings and overview of structure set up.









# A SUMMERTIME SUNSET

Photos by James Curtis, [jimbocurtis@mac.com](mailto:jimbocurtis@mac.com)

I'm a photographer by day and a luthier (musical instrument maker) by night <<http://www.jamescurtis.com>>.

These are two of several photos I shot of Ole Kanestrom and his Tabooish on the water at Port Townsend, Washington, in early June.

The Tabooish is a DLG, and this one uses the fuselage from an old Encore, a kit plane made in Issaquah, Washington, by Phil Pearson, and the wing is one that I built based on the Taboo, a kit plane built by Oleg Golovidov.

Since it's homemade, everyone in the trade calls it a "Tabooish." In other words, this plane is a mutt. But it does fly like a thoroughbred.

