Our Web site:
www.brcm.org

Skywords

March
2001

The News Letter of the Burlington Radio Control Modelers Club

Box 85174 Brant Plaza, Burlington, Ontario, L7R 4K4

News Flash from the MAAC AGM

The proposal to move the head office to Tillsonburg was turned down as was the proposal to set up a flight centre in Tillsonburg. Both of these proposals were opposed by BRCM.

Best of all, our own ***Wayne Bransfield is the new President of MAAC.***

On behalf of the club, our thanks for a job well done, congratulations on your election and our best wishes for the future. Ed.

Editorial

Our excellent web site was created by Dave Parry and he has maintained it for at least three years. Dave is now up to his eyeballs in work and the time has come for me to take over as web master. I shall do my best to maintain the site to the standard of excellence set by Dave. If you have any requests – or complaints – with respect to the site, you'll know who to ask/blame.

This month, it is my pleasure to present part 1 of 2 articles by Charlie Chomos. Charlie has a life long interest in radio control technology as it is applied to our hobby. He has an extensive collection of antique radios most of which, I understand, still work! As reported in the September 2000 edition of Skywords, Charlie won a "Special Achievement" award from the (U.S.) Vintage Radio Control Society.

I also present an extensive review of the Ohio RC Extra 300L 72" by Eric Palmer. Very detailed, this item will be invaluable to anyone contemplating building this model.

Pssst! Got any old pictures? I would like to have pictures from member's long forgotten photo archives to see "the way we were" so long ago.

This month, I am enjoying an embarrassment of riches in the form of contributed articles from two of our members. Nevertheless, I am always looking for input from the membership. I can be reached at 416-622-3705 or FAX 416-622-4134 or by E-mail: Lawrence.Cragg@Sympatico.ca or S-mail to suite 2010, 820 Burnhamthorpe Road, Toronto, M9C 4W2

Next Meeting
Thursday, March 22
"Scale!"
We will have some surprises for you.

News Flash from Hamilton

This story just in from one of our members who was there but wishes to remain anonymous:

At the Flying Tigers Challenge event, the BRCM team comprised of Dick Fahey, Reg Phillips, Tony Pittari, Charlie Chomos, and Art Titmarsh, under tremendous pressure by the Hamilton club, made a last ditch, do or die stand and were successful in retaining the Rat Race Trophy that we had already won the last two years.

The team successfully retreated from the hostile crowd while evading the slings, barbs and arrows thrown at them by the defeated Hamilton Tigers and made their way back to the friendly shores of Burlington. The Flying Tigers have vowed to take their revenge when we hold the next Great Rubber Race on our home ground.

The President Writes:

Good news for Bayview Park users: the City of Burlington has finally forwarded copies of our renewed Agreement for our partnership in the use of our section of the park. Two copies were submitted to Clyde Halford (LLB) for our Corporate seal to be affixed and returned. The next step is for Bill Hemphill and I to meet at City Hall for signing. This renewal extends our date to February 28, 2006.

A reminder that our next meeting, Thursday, March 22. will be "Scale Night." If you have a scale model of any type, bring it along for display ~ finished or under construction. We would like the MAAC Scale chairman (Chuck Smith) to know that our Club has a large scale interest group and that he should maintain closer ties with us.

See you at the meeting.

Dick Fahey, President BRCM

Who Are You?

At meetings, it would help everyone to know who you are if you wore an identifying label - even your frequency pin will do. We're looking into providing engraved labels for every member.

It's kind of embarrassing to forget someone's name – especially when you've known them for yonks!

Coming Events

These are the events that I know about so far.

March 22 Monthly meeting ~ sign up for wings program
April 6, 7 and 8th Toledo
April 26 Monthly meeting
May 4,5,6, 2001 Toronto Aviation Show, Downsview
May 24 Monthly meeting
June 2-3 Float Fly, Christie Conservation Area
June 9 Oshawa Float Fly
June 9/10 OMFC Scale Aerobatics South Field
June 16-17 Niagara, Chippawa Creek Float Fly
June 23-24 Simcoe Fun fly (contact gaunt@nornet.on.ca)
June 23-24 Long Sault Float Fly
June 24 OMFC Air Show, North Field
June 26, OMFC Electric Fun Fly, North Field
September 15-16 Float Fly, Christie Conservation Area

Your Editor's Progress

Those of you who have read recent editions of this newsletter will know that your editor is building a 1/7th scale P51. Here's a progress report:

Gosh! With a fibre glassed wing and fuselage, the P51 is beginning to look very good. Norm Harris has been a great teacher and has raised my standards several notches to say the least. There is still a long way to go before it's ready to fly but at least I can get hold of it with little fear of crushing the ultra soft balsa sheeting. Next: wing fillets.

Meanwhile, while my bench was temporarily clear, (the P51 was with Norm) I built the wing for a new Giles. That's the one that will fly with a Saito 91. This is a delight to build; well designed and the Great Planes kit leaves nothing to be desired. The wing still has the ailerons "attached." These have to be sawn off and finished but that will have to wait till there is space available to do it.

Idiots

This is the second of what may be a series. We shall see.

IDIOTS IN SERVICE:

This week, all our office phones went dead and I had to contact the telephone repair people. They promised to be out between 8:00 a.m. and 7:00 p.m. When I asked if they could give me a smaller time window, the pleasant gentleman asked, "Would you like us to call you before we come?" I replied that I didn't see how he would be able to do that, since our phones weren't working. He also requested that we report future outages

Axioms

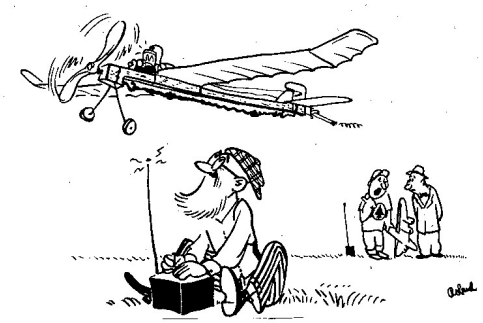
It's better to be down here wishing you were up there, than up there wishing you were down here.

The propeller is just a big fan in the front of the plane to keep the pilot cool. Want proof? Make it stop; then watch the pilot break out into a sweat.

Try to keep the number of your landings equal to the number of your takeoffs.

THE BLACK BOX part 1 of 2

By Charlie Chomos



It is difficult to discern the sequence of events that have led to the current level of technology in the radio control field. Developments may have been made on parallel lines by several people, especially among hobbyists, and to name one would hardly be fair to others less well known. Nevertheless, I will dwell upon one individual whose work provided the foundations for today's modern systems. Otherwise, I shall only generalize upon some of the early R/C history and end (in part 2) with today's "modern system."

The events and great names of "wireless telegraphy" are, of course, the foundations of radio control and the moment Morse Code, transmitted by radio, was mechanically recorded was, perhaps, the event that provided the concept of radio control. The earliest date, the birth date, of R/C was circa 1905 when, at a Paris exhibition, a professor by the name of Branly demonstrated switching on and off machinery, firing guns and other feats controlled at a distance by radio. His radio (I can only guess) probably consisted of a spark transmitter and a "coherer" receiver. This is the same type used on the ill-fated Titanic to send SOS in Morse code.

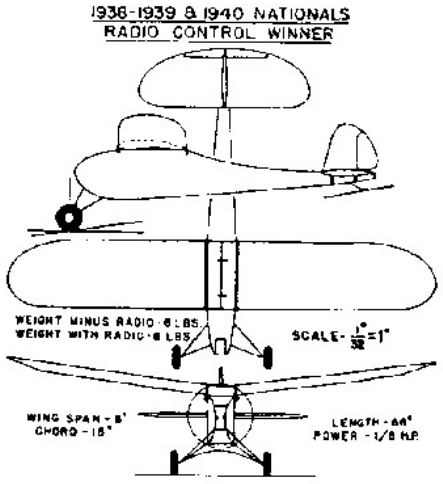
In the early 1930's articles began to appear in American radio periodicals about radio control for models. The growth was not very quick due to the transmitting regulations which excluded all but licensed radio (Ham) or amateurs. Then, in 1938, there arrived the one major development which, by simplifying and lowering the price, put R/C within the reach of all: the RK-62 Thyratron tube, followed by the RK-61. This tube was developed specially for R/C and has no use or value in normal radio circuits. We must remember that radio control units all had to be built by hand, no such thing as going down to your local hobby shop and purchasing a commercially made system. Actually, some of the first successful radio controlled models were constructed by amateur radio operators due to their knowledge of electronics.

When we think of R/C pioneering in our Northern hemisphere we automatically think of Walt' Good – and with good reason for he has been involved in radio control flying since 1935 when he and his brother Bill first started their experiments in this fascinating field. Walt, or as we should perhaps call him formally "Dr. Walter Good," had been flying models for some time. His first creation was made of kite sticks covered with dress silk. It was not a huge success but he soon got into model building in

earnest and started attending meets. His first Nats success was an 11th place in indoor cabin and, despite many firsts garnered in later years, this indoor win stands out as one of the most exciting.

When Walt' became interested in radio control he was strictly a model plane builder but he had the great advantage of his brother's radio knowledge. Bill had been an active Ham (Amateur) operator since 1932 and the pair were a natural in their joint R/C endeavors. They exhibited their first R/C plane at a science exhibit at Kalamazoo College in 1936. The next year they entered the first R/C event ever to be held at the Nationals – and came in fourth. From 1938 to 1940 they were the top men in the field winning the Nats event each year!

The plane they flew was the "Big Guff" – an enlarged version of the "Guff" that Walt had designed and flown very successfully in free flight, gas contest. A real giant when judged by the average R/C ship of today, the plane carried two-channel radio equipment for rudder and elevator control (though the latter was never used in their contest wins) and had enough cabin room to put in not only both hands but most of your arms as well! While other R/C flyers were using multi-tube receivers, and later the thyratron gas tubes, the Good brothers perfected and stuck with a single "hard" tube receiver. Their circuit was very much like that used in such sets as the "simple single" or single channel receivers of later years to come. Although they were unable to get to the first post-war Nats at Wichita, the Goods continued their winning string in 1947 at Minneapolis. The old faithful "Guff" was again put through its paces. Walt admits there was not much of the original left by this time. This was the last appearance of the veteran ship at the National contest and it also marked the last Nats that brother Bill was able to attend. Walt's "Guff" now resides in the Smithsonian Institute – but Bill expected to be around for a long time after.

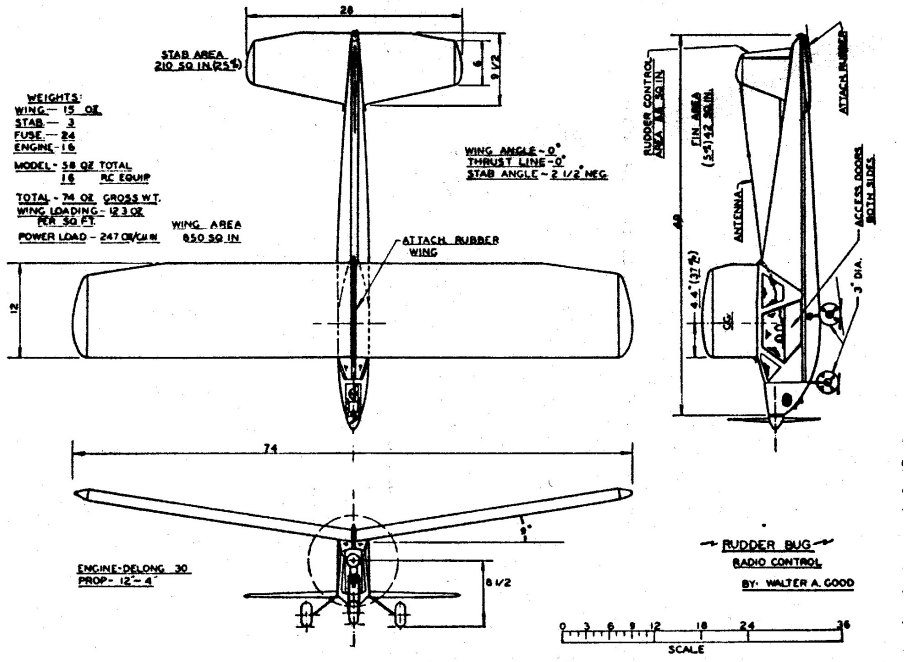


Note the radio weight of 2 lbs!

Walt next showed up at the 1949 Nats in Olanthe and he had a brand new design with him. This one – the "Rudderbug" – had been introduced early that same year and had created tremendous interest; so much so that, when the Nats rolled around 11 out of 32 R/C entrants were flying the new design! Walt continued to compete in local contests with uniform success. At the 1952 Nats Capitol Model Meet, he made an official F.A.I. flight for the R/C duration F.A.I. World record of 40 minutes, 25 seconds in the air! The motor run was 26.5 minutes and the glow plugged Forester .29 was fed with about 1/2 lb. of fuel from two large auxiliary tanks strapped on. After a Ph.D. degree at the University of Iowa, Walt immediately began intricate research at the Carnegie Institute in Washington. Later, he joined the staff of the John Hopkins Applied Physics laboratories. Dr. Good is one of the prime examples of an active model builder and radio controller who has engaged in valuable scientific work in later life. He was instrumental in the development of the proximity fuse during the war and also had a hand in the design of complex Navy electronic fire control apparatus. Walt was very active for a long time in the A.M.A's affairs. He was chairman of the board in a really hectic period of time. He also led the successful campaign to induce the FCC to set up a special spot for R/C flying: the 27.225, crystal controlled, examination free frequency. Probably, even Doc himself has lost track of the number of letters written, conferences held, R/C demonstrations given to the FCC members – all of which resulted in the 27 MHz spot which we still have today as well as our new 72 MHz spots.

Today, Dr. Good has retired to Florida and, at over 80, he still gets out to fly radio controlled model aircraft.

Next month, I will present Part 2: The systems that evolved to our present time.



If You're Curious

I am incurably curious so I looked up the definition of "Coherer" mentioned in Charlie's article. Here it is:

Coherer \Co*her"er\, n. (Elec.) Any device in which an imperfectly conducting contact between pieces of metal or other conductors loosely resting against each other is materially improved in conductivity by the influence of Hertzian waves; -- so called by Sir O. J. Lodge in 1894 on the assumption that the impact of the electric waves caused the loosely connected parts to cohere, or weld together, a condition easily destroyed by tapping. A common form of coherer as used in wireless telegraphy consists of a tube containing filings (usually a pinch of nickel and silver filings in equal parts) between terminal wires or plugs (called Conductor Plugs)

Now, can you make any sense of that in the light of today's technology?

OHIO RC EXTRA 300L 72"

This comprehensive review is from Eric Palmer

THE KIT

The box appears large not to say huge and light for a plane of this size. The outside has absolutely no identifying marks of any type. No pictures no name, nothing. Inside you first find large wads of packing paper surrounding a fiberglass cowl and a monster canopy. Closer inspection of the canopy reveals a red line marked about half way between a molded in cut line and the top. To save cost Ohio RC uses the same size box and canopy as the 80" kits. After pulling out much more packing material, plans, landing gear, and finally wood begins to appear. At some point in this adventure of discovery an instruction book will come to light as well as several lettered bags of parts and a long tapered piece of ply. Now into the meat of the kit. All small wood parts are in lettered bags divided by assembly and called up in the instructions by the same letter. But what's this? A huge bundle of sticks a few sheets of balsa not one piece so far that even remotely resembles an airplane and the box is empty. Time to unroll the plans and read the instruction book. Page one, a standard introduction that explains the bagged parts and warns you this is not a beginners kit. They also advise you to study the plans and parts before starting to build. No kidding! I read the instructions twice before some steps became clear. Then an invitation to call with any questions or comments. A nice touch, as the owners names are included in this little dissertation. We flipped past the replacement parts price list to the kit inventory list. Three pages long but broken down into sub-sections with check off boxes. A quick count reveals 180 individual pieces of wood plus 68 pieces of stick stock. Mommy help! Total parts count including plans and hardware 268 parts! My kit had every part on the list, however there is a mistake on the list and fuselage bulkhead F12 is not called up and was not in my kit. I did not discover this until I actually needed the part. Included in the kit are a fiberglass cowl and wheel pants of only fair quality. My cowl had a very heavy mould parting line ridge with a ragged cut edge. The wheel pants both had large voids at the small end that required filling along with a poorly matched seam. All parts required extensive amounts of filler to repair the surface flaws. Ohio RC has since changed suppliers to Aeroglass up here in Canada and his work is impeccable. In contrast all shaped wood parts have been band sawed or belt sanded to size resulting in beautiful material to work with, in fact I first thought my kit only had a half set of wing ribs until I opened the bag and separated the parts. The only down side is there are no interior lightening holes in any pieces. You can cut holes if you are that anal-retentive but remember this ship will finish out @ 10 lbs. fully loaded. To put this in perspective a 1% saving is 1.6 oz. and a Duralite battery pack will save minimum 2.4 oz. Later you will need servo routing holes in bulkheads and wing ribs so attend to this now. I use a piece of copper water pipe sharpened on the inside, this will leave a neat hole large enough to pass all brands of servo plugs and paper guide tubes. Take this opportunity to mark center and thrust lines on both sides of all wing ribs and fuselage bulkheads. You will need these, as none of these parts are "self aligning" I use a Sharpie ultra fine point permanent marker on balsa as it leaves a very sharp line but requires no pressure, therefore does not dent or tear wood. Use pencil on all types of ply as markers bleed excessively.

CONSTRUCTION ~ WINGS

Step one; buy new blades for your x-acto saw. You will be using this tool often. The construction sequence is wings, tail, then fuselage. Now it's time to spread out your lumber and sort by size and intended use. My personal preference is to use the lightest straightest stick stock in the wings (remember bowed is OK just put camber to the outside top and bottom. Twisted is not, use for short parts or as fuselage stringers) Do the same exercise for the sheet stock. Once again use the lightest wood on your wings, I tend to approach this job in two parts, first separate your wood by weight and grain then organize into each wing half. Weigh each bundle, the object here is to build a wing that will balance without adding tip weight so sort the pieces back and forth until nirvana is achieved. An alternative method is to deliberately build the wing opposite a side mounted engine heavy to balance the off center engine weight. Your choice. I have tried both methods and really cannot recommend one over the other. (On this ship I went with one heavy one light and it worked. We shall see if the roll rate is impacted) Three weeknights of fun and we are yet to glue our fingers to anything. Perhaps I should sell the thing now? Now unroll the wing plan and prepare to tape it down. Rats! The darn thing is larger than my building space, never mind it covers the whole workbench with some extra draped over the sides for good measure. I dislike cutting apart plans as a rule and these have an inordinate amount of wood sizes with supplemental instructions, so a bit of origami results in intact plans and creatively hidden notes. On to actual construction, pin down spruce wing spar. TA DA first lumber is cut! The mystery of the long tapered ply piece is solved. It is a wing jig; the ribs rest on this during construction. All those center lines marked earlier now must line up. This step requires a lot of fiddling to get everything right so another evening passes and still no glue on fingers! The next night things begin to really take shape, one top wing half consumes six pieces of stick stock with three pieces of sheet. Time to flip over the wing, re-align the jig and go to bed. There are no tricks to wing

construction just take your time and make sure all center lines match. Use your good old mark one eyeball plus measure up from the work surface. Always use a square when gluing ribs in place. The servo location is shown on plans but a mounting system is not detailed, you are on your own here. I left the servo bay unsheeted until after joining the finished wings, then installed servo rails recessed approx. .125" below the servo bay sheeting. This wing is deep enough to accept standard servos and still allow you to partially recess them. In my case .188" was possible without worrying about having bulges caused by the topside covering contacting servo cases. Do not spend a lot of time attempting to engineer a pretty mounting system, it will only be heavy and make the servos difficult to access for service. Remember you are going to fly this machine HARD and will need to inspect these components regularly. More screws only add up to more things to vibrate lose. I do not feel really comfortable hiding critical components behind a hatch, never mind actually mounting servos on hatches. Use hardwood rails securely glued to the wing ribs and servo bay sheeting. Joining the wings is an interesting exercise as I had never put a set this large together. After two evenings of fiddling the decision was made to deviate from the instructions as follows. I drilled a series of .188 jig pin holes in my bench top to butt the trailing edge of both the main spars against. Then set one wing in place and permanently pinned it to the bench. (You should drill pinholes through the hardwood spar angled to pull against the previously mounted .188 music wire jig pins) Slide in the ply joiner then the other wing half and follow previous instructions for the fixed half; just do not hammer the T pins right down. Double-check everything and go to bed as we will glue this tomorrow. You noticed I have not mentioned blocking up wing tips, this wing is flat across the top and we have pinned it top side down. This is why the servo bays were left open. The instructions have you blocking up wing tips and checking the spar alignment with a yardstick?? If you are really good and really brave go with their method. I prefer to have everything nailed down for a step as critical as this. To glue the ply joiner in place remove one wing half from board slide out the ply joiner and rough it up with some 60 to 80 grit sandpaper. Then mix up some 30-minute epoxy. (I heat my mixture until it just starts to flow) Spread the nasty goo on joiner, center ribs and inside the slot. Slide ply joiner back in replace the other wing half, wipe the crap off your fingers re-insert your jig pins then hammer down the T pins to fix everything in place. Now is a good time to wipe off any excess epoxy that squeezed out and put away the offensive heavy glue. Wings are almost done and 80 pieces of stick, sheet and cut to size parts are used!

COMMENTS ON WING CONSTRUCTION

Make a long sanding block, you have to sand a lot of sticks flush with ribs.

Do not trim wing center to drawing, wait until you are fitting your wing to the fuselage, as this will give a neater join line at the wing trailing edge.

Do not be tempted to apply fiberglass on the wing center section as it will be held together with one leading edge dowel plate, two wing bolts, one huge ply joiner plus it will have a belly pan built directly onto it's bottom. If you manage to fold this wing in flight and prove it I think the boys at Ohio RC have a prize for you!

Heed Ohio RC'S advice and mark center lines on leading and trailing edges of wing plus the ailerons before attempting to sand to final shape. These parts are long and there is no way you can eyeball this and keep things right.

I had never built a wing with ailerons as part of the main structure then cut them away. I was very happy with the fit and match of the parts but man do you carve and sand down a lot of lumber to accomplish this.

Do not shape the wing leading edge until the tail group has been fitted. The flat front surface with a center line is more accurate than the arbitrary curve that you will sand into it later.

Make fairly large sanding tools for shaping the leading edges of your control surfaces.

An Interesting wing-mounting system, the dowels are in the fuselage and key into a ply plate inset into the wing leading edge.

TAIL GROUP

After building wings the tail is a nice break as everything builds flat on the board. But get a firm grip on that long sanding block as the control surfaces are tapered and you build them up from stick stock. You guessed it, mark center lines on parts and get carving and sanding. Only 18 pieces used on this assembly.

COMMENTS ON TAIL CONSTRUCTION

Leave all leading edges on the fixed tail components square until alignment has been checked and any required filler blocks installed for the same reason you have not shaped the wing leading edge.

Make sure all tail group stick stock is exactly the same size. Some of mine was slightly tapered over its length or too badly chambered for its intended use, so I ripped replacement strips from in stock sheet. Ohio RC will replace any unsuitable wood without question, but would you wait for two pieces to come in the mail?

Build as light as possible, you will be mounting three servos in the tail and we do not want to add balance weight to the finished aircraft. Translation: USE CA ONLY remember earlier we put away the epoxy? That was the last and only time the ugly stuff will be used.

Build a dummy tail group to use when shaping the tail fairing blocks

FUSELAGE

Lots of parts, lots of cutting, lots of pinning, lots of fitting. You are advised to check engine size at this point as a larger (read gas or four stroke) engine will require the fire wall be moved back. More cutting! My choice of a Super Tiger G2300 precluded the need to either trim or build up the front end. It is now time to drill your fire wall for a motor mount, if the stock location is used the given offset will center the spinner in the cowl. If you have chosen an engine that required moving the fire wall here is a simple way to get the offset required. Draw your new fire wall location on the plans, now note where engine side thrust line intersects the new fire wall location and transfer this dimension onto your actual fire wall. Done, and no convoluted math involved! I assumed that you drew in your fire wall accurately and will extend the engine thrust line neatly. Now we are ready to go! First join the fuselage sides, which results in two very long slender

pieces which must be straight across the top. Darn how to accomplish this? My solution was to glue a long strip of sandpaper to a sheet of glass that I normally use for final set up and cutting covering on. Now pin your parts together with the bottom profile matched and gently sand the top until both sides match, perfect right? Make sure as this is the fuselage thrust line and everything else is built from here. Building up the front end is different as you assemble two bulkheads and the fuel tank floor then attach this assembly to the fuselage sides. An interesting and somewhat difficult step. Alignment of the two structures is critical, not only are you joining the fuselage sides to the fire wall assembly you are also forcing a curve into the front fuselage sides. Take your time. My method involved pinning down the fuselage side with the bottom edge blocked up to match the desired final curve then gluing together with CA. Mark the location of the outer fuselage side on the inside of the lite-ply doubler to match F2 with. Once the accelerator fumes have cleared remove pins and the finished size of the aircraft becomes apparent. Now to join the left side, Finally we are ready to make a plane. Skip mounting F3, F4, F5 and the gear plate until F7 to F11 are glued to fuse sides. The front end is very hard to pull in far enough to mount the gear plate. I needed the fuse as stiff as possible to accomplish this without having the parts pull off center. These pieces are up off the bench and I was unable to find a way to jig them into place. The old go slow measure twice, glue once instructions apply. If you build like I do it took two evenings to set up and one to build. Included is the time taken to drill mounting holes in the landing gear and mounting plate. Preassemble F4, F5 and your gear plate, as this will give you more to hang onto while wrestling it into position. First mistake in instructions, bottom fuse sheeting called up as .188 but inventory list shows .25 and that's what you have. If you read the instructions with the plans spread out you will have discovered this and changed the instructions accordingly. Finally the thing sort of looks like a plane and its time to unpin the assembly and flip it over. I found the fuselage still quite flimsy at this stage in spite of the spruce stringers and cross bracing. This caused some misplaced concern but not to worry as there is still a surprising amount of lumber to add. Here is the point the errant F12 was discovered, after beating myself up over missing the part (Remember we spread out the plans and supposedly matched up all the parts required for each assembly) I decided to keep building and called Ohio RC the next morning to obtain a template as there is no view on the plans that can be used to get F12's dimensions. During my conversation with Bob from Ohio RC I expressed some concern with the strength of the gear mount as it is cantilevered out into space on .188 balsa and .125 lite-ply. Bob admitted this had been a common failure point and the front end had been redesigned to strengthen this area. The fix for me was to install two .375 Dia. Dowels through F2, F4, and F5. This spreads the arrival loads over a much larger area. Bob said if I still managed to tear off the gear it would mean I had landed on the spinner and would then need a new re-designed fuselage. The suggested fix added a tremendous amount of stiffness to the front end without adding much weight. Back to the original reason for calling, my errant F12, Bob faxed a dimensioned drawing and I cut the part from some in stock scrap ply. Next mistake in instructions, when you come to sheet the cockpit floor do not use the 36" long sheeting as called out on the parts list use one 24" sheet then cut the other into 2 sheets 12" long. This will give one splice on each fuselage side centered on FT2, rather than one on one side and two on the other. A small complaint but I personally dislike butt-joining un-supported sheets then attempting to curve same. At last an airplane has been wrestled from the pile of lumber.

COMMENTS ON FUSELAGE ASSEMBLY

Work slowly and carefully you will have to refer to the plans and bill of materials often

Many steps are left off the instructions and the plans are your only guidance so do not mess them up!

I had a lot of trouble getting F12 glued in place and aligned. I removed it twice with debonder and finally made a wedge shaped clamp to hold everything in place. If I ever build another I will leave F11 out until the entire fuselage is complete.

You will need to do a lot of trimming and fitting for the canopy as it is easily twice the size actually required and the marked trim line would have resulted in the canopy being too small. Take your time with this step as the canopy is inset into the fuselage sides so must fit exactly.

Leave off the .188 canopy stringers and instrument panel until the wings and tail are aligned and fitted as this will leave a nice large flat surface to place the fuselage on when you flip it over for wing mounting.

MOUNTING WING AND TAIL

This is the task I dislike the most and conversely is the most critical and difficult step in the whole assembly process. Follow the kit instructions or use Harry Higleys method from his book Mostly Mounting. I use part of Higleys method as it results in the wing being clamped into final position well before you have drilled any permanent mounting holes. This allows you to flip over your plane to trial mount the stab and fin without being committed to a final wing position.

COMMENTS ON WING AND TAIL MOUNTING

I had to do an inordinate amount of lower fuselage trimming to get my wing to fit at the front end. (The opening on the plans appears large enough but after you pull the curve into the lower fuse the opening is substantially reduced) Take your time and remove material in small amounts, remember you need to have enough room to tilt the wing to remove it.

Once you can seat your wing, fully trim the trailing edge to fit.

I needed to sand one side of the wing saddle to get my wing square to the fuselage side, which then caused the stab platform to require the same correction. My first reaction was to leave well enough alone but my vertical tail did not run true to the center line marked on F12 and would have required a filler block on one side with a skewed hinge line.

In spite of my best efforts it appears that I managed to build my fuselage with non-parallel sides. (Perhaps my bench is not as true as I first thought. The next airplane will be built over my sheet of plate glass)

Make and install wing bolt guide tubes inside the belly pan. A lost bolt inside the finished and covered belly pan will be very interesting to recover. I used some left over servo lead tube. Paint

the interior of your tubes as fuel proofing, exhaust will be blasting past these every second your engine runs.

FINAL ASSEMBLY AND SET UP

You are not finished!! Even though the instructions have run out there is still the small matter of a belly pan. Follow the plans and use some .063 sheet scrap with wax paper to create a glue proof gap between the fuselage and the belly pan bulkheads, otherwise you will now have a one-piece plane. I left all the inside bulkheads out until after adding the spruce stringers, as plan locations resulted in a curved belly pan and the plans show a straight line. Once all stringers were in place I just inserted my bulkheads without pushing up the stringers and added cross bracing. Now is a good time to go back to make up your servo mounting system in the wing, final sand the assembly and put the completed wing away until it is time for covering. This leaves the fuselage alone on your bench ready for servo mounting and finally adding the canopy stringers along with those lonely instrument panels. You will need to space out the elevator servos if you use standard size equipment. (Aileron low profile servos may mount flush.) Do take the time to make a hatch for the tail. Mine is just balsa sanded to shape, covered then glued on with a thin layer of silicone.

COMMENTS ON FINAL ASSEMBLY AND SET UP

You are on your own now so hopefully experience and building skills will carry the day

The instructions do carry on with some final notes including a reminder that hinging is the most critical part of assembling the model and to seal all hinge gaps

No recommendations on covering wood parts or painting the fiberglass parts are made, but we all use iron on covering and the structure is strong enough to do its intended job alone so iron away with your favorite shrink wrap. Paint with a fuel proof high quality model paint, do not be tempted to use cheap substitutes. My experience with automotive touch-up or Krylon and its imitators has been less than satisfactory. I personally now use Perfect Paint with uniformly excellent results over a variety of different materials including Mono Cote, Ultracote, ABS and fiberglass.

I chose a semi-scale covering scheme that features a horizontal color division line the length of the fuselage. Experience has taught me that you cannot fly crisp maneuvers without a good reference line. As usual it is red and white.

POWER PLANT

Go big! I chose a Super Tiger G2300 1.41 cubic inches and tough as nails. I plan to run this power plant hard and with Super Tigers reputation as a long running reliable engine I have no fear that the odd lean run fully cowled will harm it.

30-oz. bare weight, which is the same as all the competing 1.20 size engines. This engine will ingest 15% nitro standard oil content fuel without becoming bad tempered. Remember that this brute swings a 18X8 prop with enough authority to macerate anything that blunders into its path. Please respect the amount of power these things develop and always use a mechanical restraining device when starting.

RADIO GEAR AND CONTROL LINKS

Six Futaba servos with one 9101 on each aileron and elevator half, one 9102 on rudder, one S148 for throttle. All flying surface connections are currently 4-40 threaded rod, Du-Bro ball links on servo ends, Sulivan metal clevises on control horn ends and Du-Bro heavy duty servo arms. I used the kit supplied control horns mounted per instructions in spite of some initial concern over the long-term integrity of the system. After debating installing a different style of control horn, commonsense prevailed. Screws driven into ply plates are just as rigid as mounting plates sandwiching balsa, plus it will not compress the wood and loosen over time.

Radio is of course my Futaba 8UAF. I have grown very fond of this radio, its programming flexibility is limited only by your imagination and I personally find the steps both logical and easy. With that said if you have no computer radio experience buy Don Edburgs programming book. It will steepen your learning curve plus provide a lot of insight into how the programming steps are interconnected.

FINAL IMPRESSIONS

A relatively complex kit to build with a high parts count and some substantial gaps in the instructions.

Flat tail surfaces compared to airfoiled as on most of the competition.

With the current crop of smaller lighter high performance servos a Duralight battery pack and lightening holes this toy could come in at 9.5 lbs. or less.

The cowl will completely hide any engine you chose to shoehorn into it with the exception of the Saito 1.80 or a Gas burner, but stay with glow powered 2-strokes as the whole idea behind this airplane is a low finished weight.

In spite of some construction problems the kit finishes out into a beautiful flying machine. But if you are not a very experienced builder do not attempt this airplane until you have at least three different kits or a scratch built project under your belt.

Several changes have been made to the kit since I purchased mine, which have addressed the weak landing gear mount and poor fiberglass work. In addition the new kits now include both front and rear instrument panels.

Kit supplied wood is very light with grain structure appropriate for its intended end use. Some sheet is supplied six inches wide so you do not have to do any edge joining.

Cowl fits flush with fuselage sheeting rather than overlaps. A little more work to fit but the end result is well worth the effort.

Excellent kit supplied hardware including Allen head bolts, button head screws, steel axles, steel 4-40 clevises with spring locks. All supplied items appear to be familiar brand name products.

Formed aluminum landing gear that required extensive polishing to remove its rough outer surface.

While not a large aircraft it's size presents well without being too large for one person to manhandle assembled or disassembled, just keep your eyes on the tail passing through doorways.

I will definitely build another kit from this supplier, perhaps the Giles 202 with plug in wings @ 80'' (do you want to sell a Moki 1.80 to a good home?)

Burlington Radio Control Modelers
Executive
2001

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