

BIGGA-BIT

Right, hold on to your hats! Dereck Woodward presents his fast and furious 42" span tailless wonder for up to .32 size engines

build from our full-size
PLANS

In the beginning, there was 'Little Bit', born of a requirement to field something small at the first Old Warden Nexus Small Models Day. 'Little Bit's' parents were a 'Bubbles' wing plan and a programmable copier, with a sense of urgency as midwife!

She flew! Her 049-impelled 28" span make toes curl. But even this was too large for Shane Harding; he crossed the plan with a copier to produce the 21" 'Tiny Bit', also published in *Radio Modeller*. This Cox TeeDee 020 rocket owned the sky, ignoring any ideas about small models.

'Vintagent' Gordon Counsell stepped a tad out of character for the second OW Small Models bash with 'BIG Bit' - a 34" span incarnation for an O.S.15. Regrettably, Terra was induced by Firma and reduced 'BIG Bit' to micro bits.

1993, Sue and I move to America, land of the megamodel. A need for something to frighten the population hereabouts produces the heavyweight of the 'Bit' saga. Yes folks, it's a 'Bigga Bit'! A 42" twice-size large model of Shane's 'Tiny Bit'. Okay, complications got into the act. The rudder now waggles and optional landing gear makes 'Bigga Bit' a little more conventional in arriving and departing. Originally flown with an O.S. 25, my O.S. 32F ABC muscled in for more vertical. As I

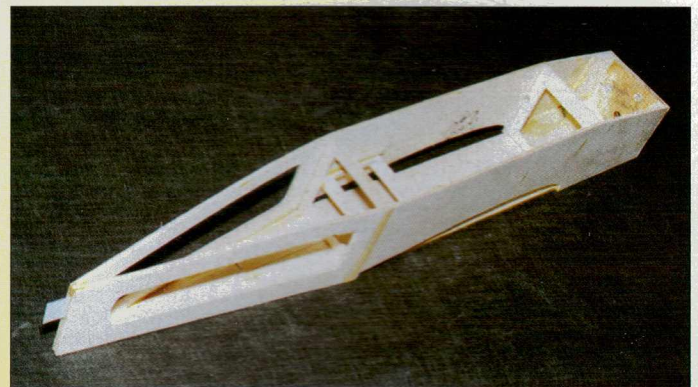
expect many extroverts to build 'Bigga Bit' at below mine's uncharacteristic 54 ounces, true unlimited vertical is now about a week of building away!

What can you do with a 'Bigga Bit'?

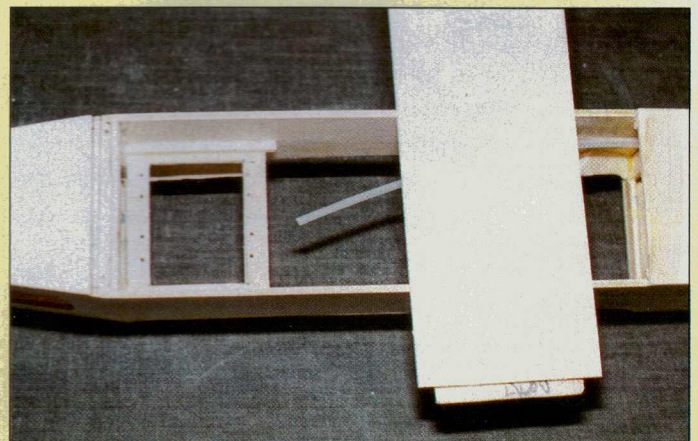
Pretty much what you like - the common stuff is easy. Fast rolls, slow rolls, four point rolls, huge loops, tight loops, Cuban Eights, Avalanches - you know the drill. Rolling inverted as she leaves the ground then going vertical for a few hundred feet never fails to announce that you're airborne. As she's a high drag sort of machine, you can then chop the power and fly a steep curving descent back down to skim the grass, before blasting off back up to show anyone who missed it the first time.

Despite the drag of that flat front and 14% symmetrical thick wing, she is still one of the fastest in a big club obsessed by speed. There are faster models - sub three pound deltas with hot 46s. They are tricky to beat!

I always look for a spectacular party trick with my models - with 'Bigga Bit' it's a negative snap roll entered with full down, full right rudder and aileron, which turns into an end over end tumble, degenerating into an inverted



The main body bit as it ends up sitting inverted on your board. At this point, the top sheet still has the piece where the wing will fit in place - gets cut out when together. This ship starts life upside down!



The radio bay, with the hatch. A tongue holds it at the front, two screws do the job at the back end. I've already got the servo tray in place at the back end of the radio bay.

spin. Once in the spin, I go into idle power and introduce left aileron for a flat spin. She descends much slower than in a regular spin, and virtually rotates around the prop.

glue you use for foamboard - the regular stuff will dissolve the foam middle layer of foamboard. As I tend to use PVA more than instants, that is no handicap.

I'd recommend gluing the spar to the balsa LE sheet and sanding the join out smooth before assembly - this is easier than when it is on the wing. The interspar webbing goes between the spars - do not, under any circumstances, have an attack of the idles and stick it to the back edge of the spar. This is especially the case if you use foamboard, as you'd be making a 1/16" deep glue joint onto a sheet of paper - not too

bright!

As the wing has a constant depth, it is easy to cut the webbing to the correct depth before gluing it in.

Fit the webs before you fit the top spar - this is much less fuss than trying to slide them in later. It helps to mark the web position, to ensure they are all central. When done, attach the top spar and sheeting to complete the 'D' box. The wing, when finished, is very strong and light.

The elevons were made from 1/4" foamboard, edged with balsa. The LEs are angled as usual; bear in mind that elevons move through a greater angle than ailerons, so bevel accordingly. The lack of taper doesn't affect the roll rate and it saves all that tedious carving and sanding. You could just use light, stiff 1/4" balsa, or even build them up as per the 'fun model' genre - bear in mind that 'Bigga Bit' is a very fast, hard turning model. If you cannot live without a taper, use balsa and go from the 1/4" LE to 1/16" at the elevon TE.

Mounting the elevon servos is easy. After sketching all sorts of complexities - and even using one initially - I fitted pieces of 1/8" Liteply between the ribs and screwed the servos into the servo shaped holes. The servo leads can be led through paper tubes back into the radio bay. Even simpler - cover the bottom of the wing, fit the servos and feed the leads into the fuselage through holes in the ribs before covering the wing topsides. You need to trust your servos - getting them out means cutting your lovely covering job open.

Wingtips? 1/8" foamboard or 3/32" balsa again. The tips are built up to the depth of the wing TE to blend in with the elevons. Incidentally, those reverse tapered elevons started on the 'Little Bit' and have been a 'Bit' trademark

Recovery is within a half turn on neutralising the controls, exit inverted to prove which way is up.

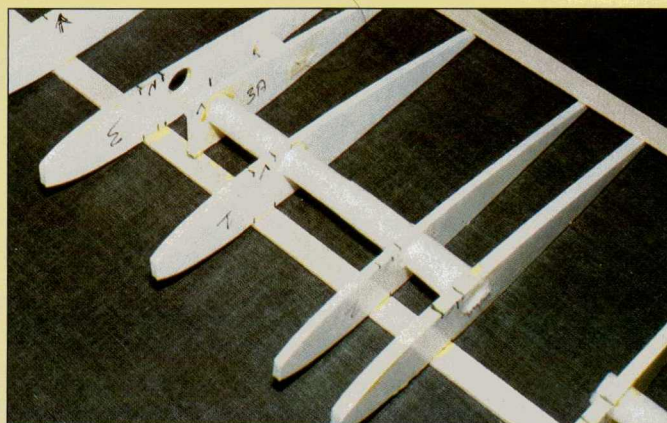
With the O.S. 32, this model is not for the faint-hearted! Even so, she could be a first unorthodox model for the flier who knows which way up his fast aerobatic sports model is. That's about as close to 'trainer' as she gets - and then only if you fit a cooking 25. With a really potent 25 or 30-something, she goes very, very fast...

Can't wait? Don't blame you!

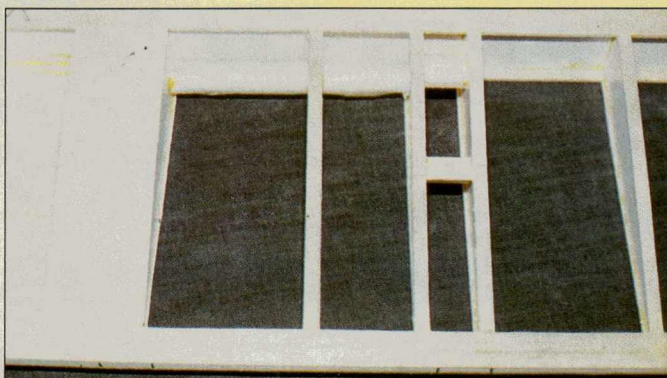
'Bigga Bit' was intended to build fast. There isn't much airframe; it was designed around a mixing Tx for her elevon control, and it has few parts. Let's start with the thing on top.

To get around complex wing rib shapes, I made the spars from 1/16" x 1/2" spruce glued onto the back of the 1/16" LE sheeting. This idea came from Steve Kerry - he thought it might work. You bet it worked - nice one, Steve! As the ribs are either sheeted or capstripped, they are nothing more than a curved outline with flat ends. Cut one as a template, whiz round it with a knife to cut the rest and that's it.

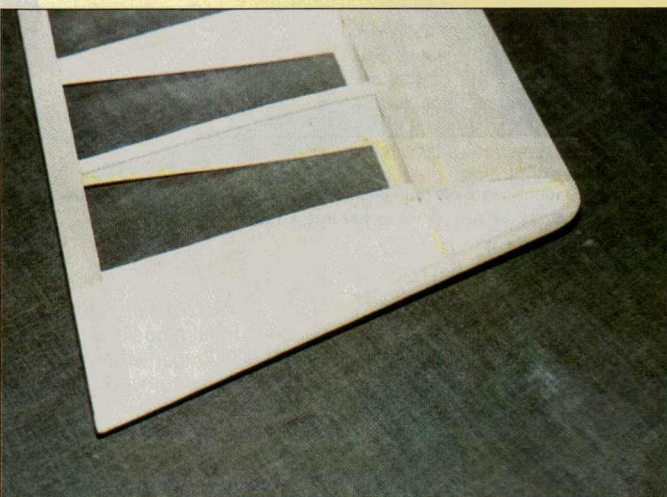
I used 1/8" artist's foamboard for the ribs and interspar webbing - it is easily obtainable hereabouts and cheaper than balsa and nearly as light. If you prefer balsa, use medium grade 3/32". Just watch which cyano



Basics of the wing structure involves sticking the ribs onto the bottom spar. 1/4" ribs (cut from 1/4" artist's foamboard) line up with the fuselage sides, the rest are 1/8" foamboard. Substitute 3/32" balsa for 1/8" foamboard, 3/16" balsa for 1/4". The tubes are made from paper and are for the elevon servo leads. Servos are close enough to the fuselage so that you won't need extension leads.



Most of it together - lots of white is due to the white paper covering on the foamboard - ribs and interspar webbing.



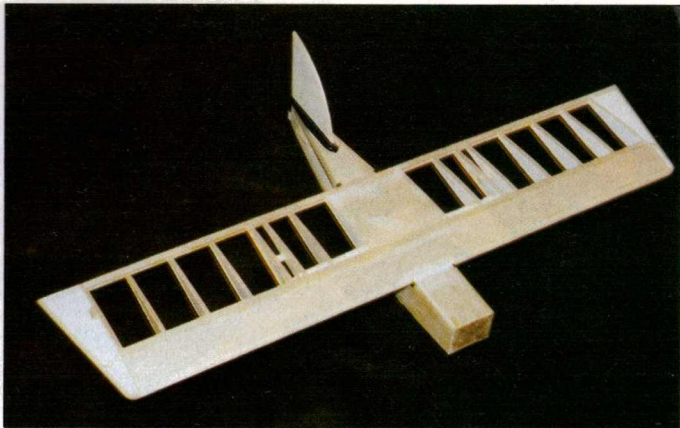
Wingtip is pretty simple - more straight lines here. You'll extend the TE from the wing by raiding your scrap box. More 1/8" foamboard here, but 3/32" balsa will do fine.

ever since, with no sign of flutter. They do perk up the roll rate though!

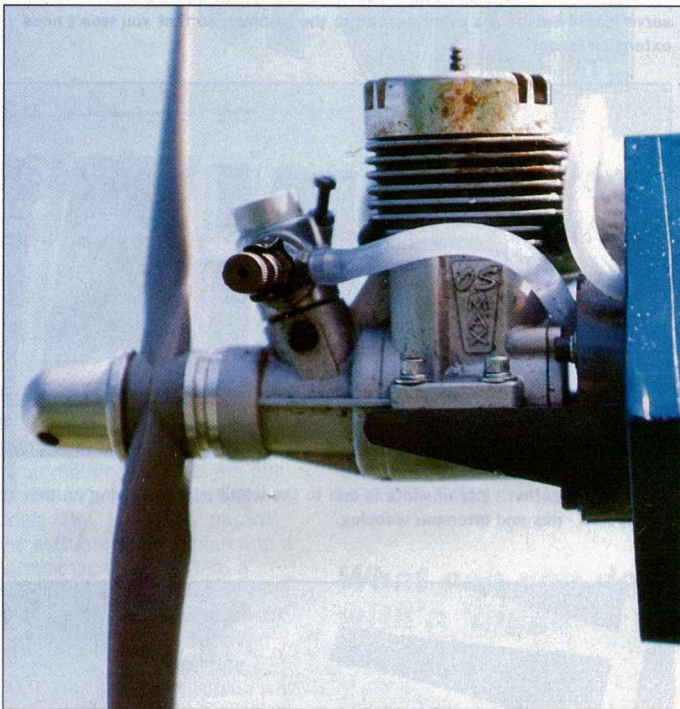
A box

Is the best way to describe the fuselage! I used Liteply for the

fuselage sides, balsa for the top and bottom. For a jig, cut out the top sheet including the piece where the wing goes. Before starting, cut through the wing aperture, apart from a 1/4" at each edge. This gives you a good, straight start for the fuselage, as



This is it, before covering. The dark part by the fin is the already covered triangular reinforcement. This is one fast building hotrod.



The engine mount has a certain simplicity to it. Access and cooling are superb. This is an O.S. 32 SF ABC - makes her into a real hot vertical ship.

you glue the formers to the top sheet. Think carefully, so that you impart the correct 'right' thrust to F1.

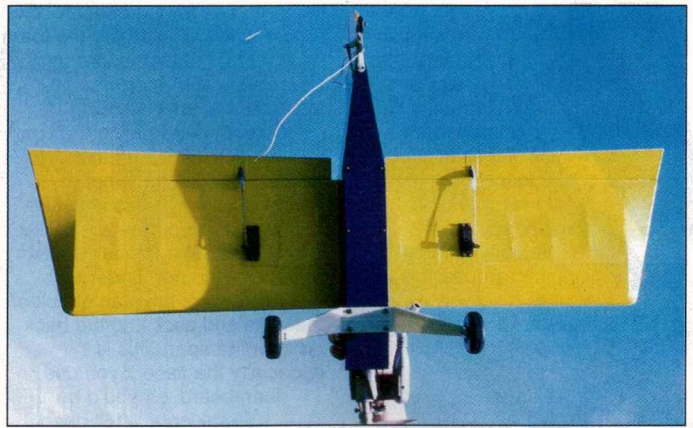
The sides overlap the top sheet so you can assemble the lot on the bench. After assembly, cut out the bit over the wing and glue the fuselage to the wing - there's not a lot to get in the wrong plane, so try and get it straight anyway. I added some triangular stock to the inside of the wing/fuselage join, to give more gluing area.

Up the front end, the fuel tank slides through a matching hole in F2, rails built up from scrap strip balsa keep it in order. This is the kind of thing you draw on the plan before starting - makes life easier. Now is the ideal time to fit the R/C gear, fuel system and so

forth, before sheeting up the bottom. Fitting the fin and rudder won't take long, neither will fitting the undercarriage and making the 1/8" Liteply bottom hatch for the radio bay, so you're about ready to cover it all up.

Hiding the woodwork

Light, cheap and cheerful are what's called for here. I used Econokote - a cheaper, lighter version of America's ubiquitous Monokote. If building in pounds sterling, Solarfilm will do fine as it is about the lightest film on the market (at least when I left; if I'm wrong - sorry!) Remember, every



Showing off the undercarriage attachment and the air-cooled wing servos.

ounce counts when the nose is pointing straight up!

For power I used both an O.S. 25 FP and an O.S. 32 F ABC. The 25 was fun, the 32 is fun plus WOW! Any of the 30-somethings - ASP and Irvine 36s and so forth - will lead to blistering performance. The hotter 25s would be good for all but the most extrovert. A 40 would require so much tail ballast that she'd fly like a breeze block, but if that makes you happy, feel free. A better scheme would be to scale her up again - someone flew an 80" span twice size 'Bubbles' on a 60 a few years back and loved it. Don't worry, I won't be offended, as the likelihood of my doing another 45 powered tailless is slim to little.

Another? Yes - I said 'another'.

Okay - let's take the sky over

Control settings - don't let any differential creep into roll. Unless you get the up and down roll throws exactly the same, she will 'barrel' through rolls. With differential, you get a pitch input every time you roll and it won't go

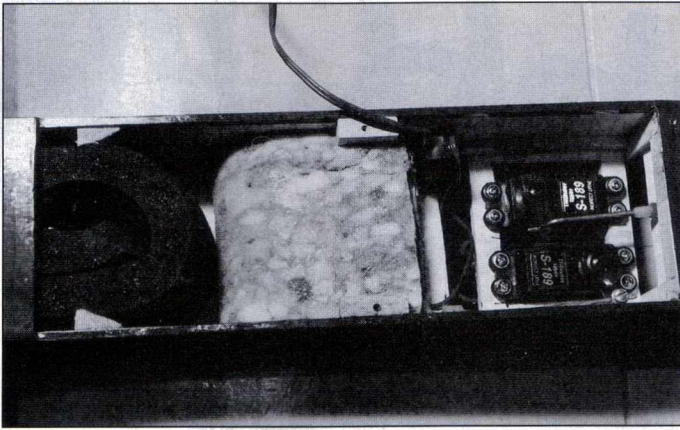
away. If you have equal 'up' and 'down' in roll, they cancel each other out. Sit down and work it out, or take my word for it - differential is out in roll. As she loops the same inside as out, you don't need any pitch differential either.

The trick is to get the elevon servo arms at right angles to the servos, then get the elevon horn holes dead over the hinge line before you start. Then fine tune everything until you get plus and minus 1/4" each way set on pitch and roll separately, with 3/32" of reflex for starters. That will get you safely clear of the ground, assuming you balanced her as shown. Balancing her on your pudgy fingertips in a breeze in a field might work for a FunBox - it isn't accurate enough for a tailless. Do it accurately at home with plenty of working space and time to get it right. Balanced right a tailless is a drama-free flier. Tail heavy, it'll re-kit faster than any conventional ship!

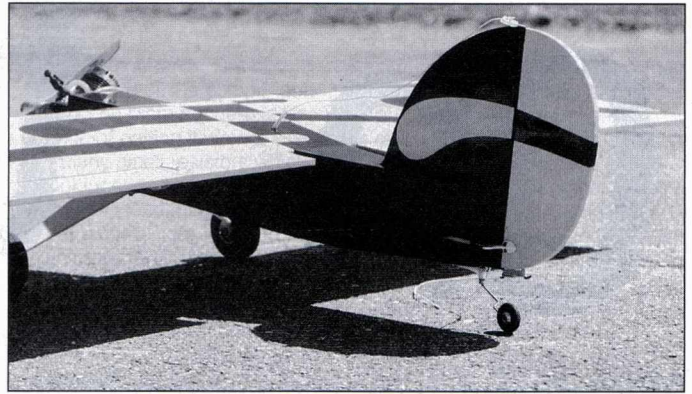
The first take-off is always exciting. At least you know that one has flown - imagine what I felt like. Ever driven a Mini flat out over a rough road? Well 'Bigga Bit' is a stiffly sprung, short wheel

Tecspects

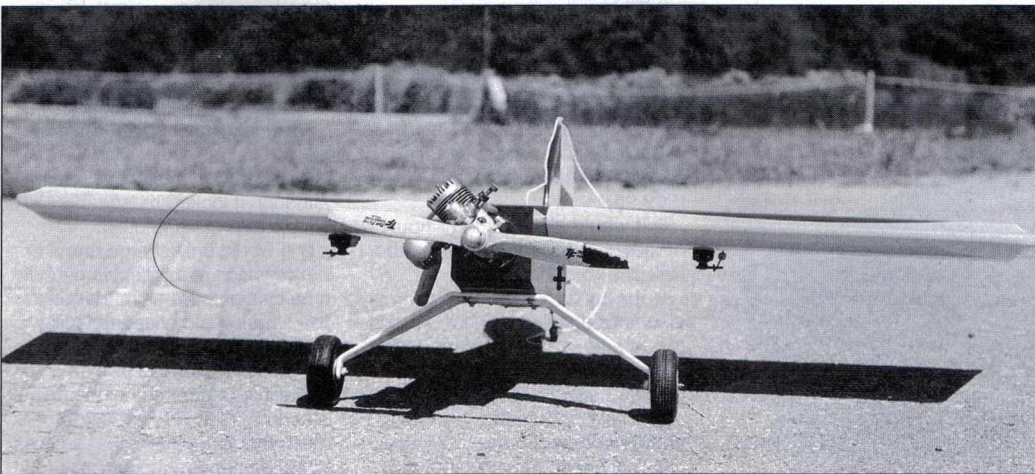
Model name:	Bigga Bit
Model type:	Tailless aerobatic
Designer:	Dereck Woodward
Wing span:	42"
Engine range:	.25 to .32 cu. in. 2-str.
No. of channels:	4 - Rud, throt, electronically mixed elevons
Construction:	Built-up. Artists' foamboard and/or balsa
Covering:	Solarfilm or equivalent



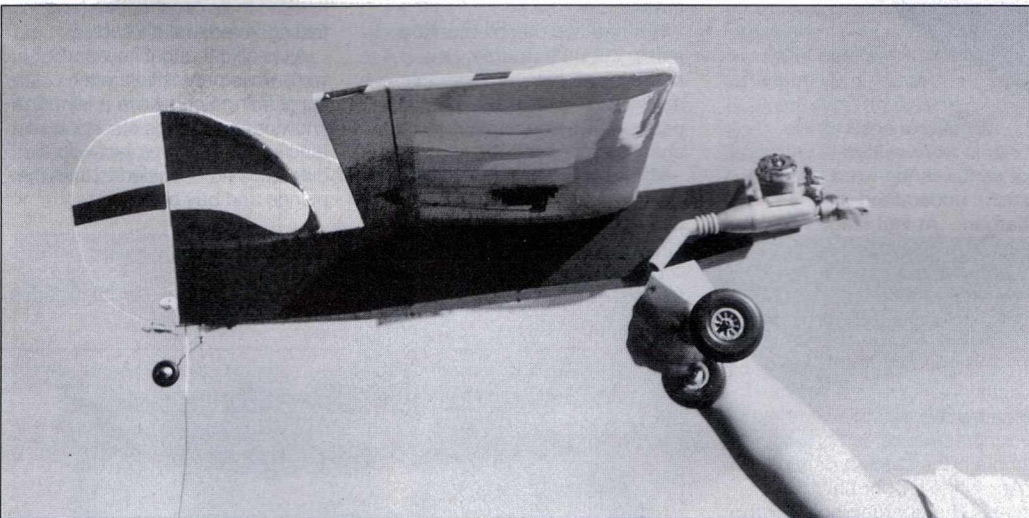
The R/C bay has plenty of space. The two servos are at the back of the bay, the receiver is well foamed up next, and the rest of the foam is there to fill up the space at the front.



Designer tends to the viewpoint that rudders can't be too big! While the size is due to its being not too far from the front, it also helps with snaps, spins and a stomach-wrenching effect that looks close to a Lomcevack.



Front end view shows the composite Klett undercarriage and the angled engine mounting. This gets the carb. down to a decent level against the tank and also gets the exhaust extension into a decent position to dump the exhaust nastiness clear of the model.



With the air cooled wing servos, keeping the oil off the wing's bottom is a good idea. The angled engine mount and exhaust extension keep oil off most of the airframe. If you have trouble keeping these extensions on, drill through the extension and tailpipe and use a mutilated paperclip as a safewire. A smear of silicone bath sealer helps stop splatter from the join, as does a tie-wrap, but the paperclip will definitely stop the tube falling off.

base number like the Mini and can be similarly choppy. Take it gently at first, ease on the power and hold in full 'up' to keep the

tail down. Don't wave that big rudder around too much, be gentle. If you suffer from a bumpy surface, leave the wheels off and

chuck it! I'd take off the tailwheel as well, as it gets in the way when landing. With the O.S. 32 up front, a hand launch is more of

a hand release. I usually add a little up trim and launch her underhand with a gentle push. After around twenty feet to accelerate, I pull her to vertical and wind the trim off as she heads vertically away from Mother Earth.

Airborne, the shape gives the same clues as a regular model - the lack of any long parts gives low inertia and fast control reactions. Her speed range is vast, controllability is good throughout. Watch for yaw/roll couple on that rudder, thanks to the high wing layout. Pitch is heavier than you might be used to - the 'elevators' are very close to the CG. The initial reflex setting of 3/32" is there for safety and you should be able to take that out before long. Roll is fast, with the short, stubby wing.

Go high, try her out. If she wobbles in pitch with a hard pull up, check out the stall. If she whips into the stall, move the CG further forward. No stall? You may have too much 'up' throw. The relationship between reflex, CG and pitch control throw is one to tune to your liking. Just watch that you don't get the CG too far aft!

The rest of the interesting bit is all playtime, before the landing. Remember, take-off is optional, landing is compulsory! She's a little like a delta - too slow, too nose high and down she'll come with a fast sink rate! So, back on the power and add a little up trim to slow her up. Fly the pattern and back the power on finals to bring her down. Over the threshold, power to idle and flair as the wheels skim the grass.

My favourite landing approach is a fast low overshoot (keeping the wheels off the grass is high enough!) into a half loop to inverted. Fly the 'downwind' leg inverted, slow up and pull through a half loop to l-o-w on finals. Thanks to the high drag, it is possible to land off the bottom of the half loop to upright in a stiff breeze. This is not a model for

