Precision Aerobatics

Electric Shock Therapy!"

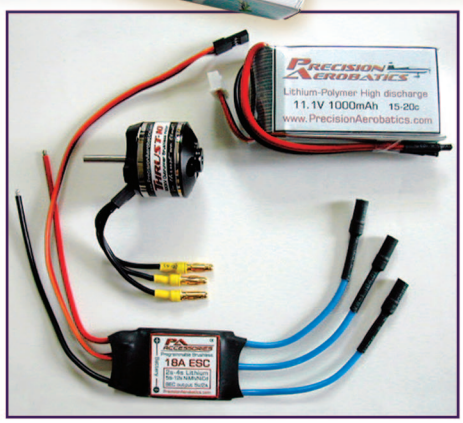
by Clarence Boudville

SPECIFICATIONS

Wingspan:	780mm
Length:	820mm
Wing Area:	326sq.in
Rec Motor Setup:	930kv outrunner
Rec Battery:	3S1P, 1000mAh, 15C-20C Lipo
Rec Radio:	Sub micro servo's and receiver
Rec Prop:	10X4.7SF
Type of Construction:	Laser Cut Balsa with carbon fibre reinforcements
Type of Aircraft:	3D Park Flyer
Skill Level:	Beginner to Expert 3D

SETUP USED

Power Plant:	PA Thrust 10, 930KV outrunner (Front mounted)
Battery:	PA 3S LiPo 1000mAh 15C-20C
Connectors:	Deans
Servo's:	Hitec HS55 with PA Carbon Servo Arm extensions
Electronic Speed Control:	PA 18A programmable brushless ESC
Receiver:	Berg DSP 5
Radio Gear:	JR PCM 9X
Prop:	APC 10X3.8SF & APC 10X4.7SF
Landing Gear:	PA Carbon landing gear c/w carbon wheels



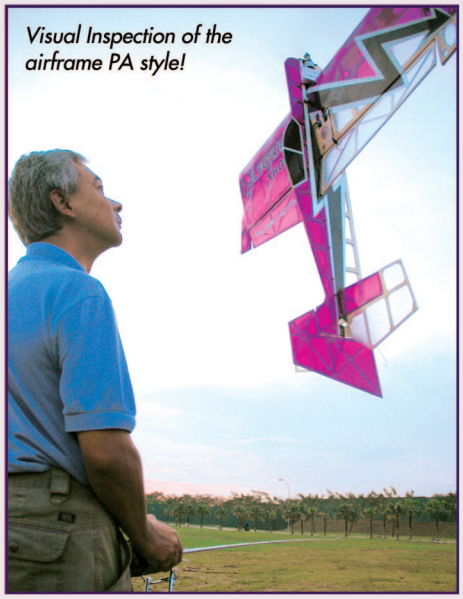
Having owned a similar 3D balsa profile previously, I was initially a bit sceptical about the PA Electric Shock. It was also the reason why I only purchased the combo version that came with only one PA 1000 mAh 15C Lipo pack being curious about what the enthusiastic raving was all about in the forums. Having flown a considerable amount of foamies on a regular basis over the span of two years, I became very jaded about how great foamies were especially when it comes to learning 3D due to its robustness, exceptional low wing loading and most importantly, the relative ease of maintaining stable hovers. So how could this skinny balsa profile be any better, I initially though.

Anyway curiosity got the better of me and against all my initial preconceptions, I succumbed to getting one. Unlike my previous purchases in the past, I told myself to get everything the manufacturer recommended and hence the combo version comprising of the carbon landing gear set, carbon servo arm extensions, PA Thrust 10 outrunner, PA 18A ESC and PA 1000 mAh 3s1P Lipo pack to test fly this plane with a stock factory setup. The plan was to ensure no deviations were done with the exception of the APC 10X3.8SF which was the only sized prop I had at the time. I wanted to know how good is good.

First Impressions

The Electric Shock arrived and as usual I could not wait to open the box, probably a juvenile habit I never seemed to learn to kick or so my better half seems to think. Everything was well packed in clear plastic and tape. Good, the plane survived the journey intact. The first things that caught my eye were the carbon bits. The landing gear and wheels (yes carbon wheels), motor mount, wing tube, push rods, control horns and the tiny carbon servo arm extensions. While being so used to seeing either wooden, plastic or at best fibreglass parts, the carbon bits were a welcome sight for sore eyes. The word "Sexy" comes to mind!

The parts were then unpacked and I proceeded to check each and every part. The profile fuselage was the first to be check by placing on a flat surface to see if it cupped, twisted or bowed a very common case of balsa profiles. The fuselage check out fine, no cups no bows no twist, impressive. The pre-hinged horizontal stabilizers were then checked out. No warps or twist and had enormous throws and very free movement. Good news since being the lazy bum that I am, I usually hate to hinge control


Visual Inspection of the airframe PA style!

surfaces anyway. The two piece wing was then checked out. No warps or twist there either.

Again the "user friendly" pre-hinged ailerons were a welcome sight. They had massive amounts of throws and movements were smooth. There was a slight warp in one of the ailerons but then the instructions clearly stated that this was to be expected and was easily cured with an iron. The rudder is huge for it size. Appears to be more than adequate to execute with knife edge manoeuvres and probably has the potential to execute knife edge loops.

Dry fitting came next to check out how this will be assembled and to also plan the build. Putting everything aside and trying hard to resist the temptation to build, I went through the manual in detail to plan the build to make assembly easier. The build photos in the manual were a welcome sight and were a great help to visualize the build.

The Build

The build has been pretty much a walk in the park and with the clear and concise graphical installation guide it should be a fairly easy task for most average modellers with prior experience building balsa ARF's or foamies. Some key aspects that an average modeller may face during the build shall be covered in greater detail.

The key to a successful build in this case, is to follow the steps without the usual skipping back and forth and to digest the manual before attempting the build and to dry fit the major components together to see where things go.

The manual begins with a section on equipment selection that list the various components for optimum performance. A peculiar statement in the manual "The Electric Shock does NOT require LG" caught my attention. It's very rare to see a statement like this as most 3D park flyers will either come equipped with or without landing gear and there is no mention in the manual if you need it or not and is usually left for the owner to decide. It is a gutsy statement I thought to myself, especially considering that I have ordered my combo along with the optional carbon fibre landing gear and wheels and here the manual implies "You don't really need it". This can only mean one thing; "Easy hand catches". Wow! Since I had already purchased the carbon fibre landing gear, I decided to install it. The carbon fibre wheels are just too funky and would be a waste not to have them installed.

I found the pre-assembly steps very informative and clearly address aspects in dealing with potential warps and twist in the airframe attributed to environmental conditions during shipping. This has been a great help in quickly resolving the slight aileron twist which might be mind boggling to the uninitiated.

The Thrust 10 simply bolts on to hard points on the fuselage via a CNC cut carbon fibre motor mount. Although the manual indicated that sanding the hard points may be necessary to get the 2 deg right offset, I was delighted to find that the angle was spot on right out of the box.

Next, the necessary openings in the fuselage and wings were made in one go by means of a hot soldering gun to accommodate the carbon wing tube, landing gear, horizontal stab, pushrod guides and servos. With the preplanning done the previous evening, I had made alignment marks on the ply pushrod guides that made the assembly and precise pushrod alignment a breeze.

Work on the wings proceeded without a hitch and only entailed shaving off the servo openings a hair wider to accommodate the HS55 servos. The PA carbon optional arm extensions were already installed during preparation. The carbon control horns were then prepped by light sanding to get a better glue bond and DRY installed into both ailerons and proceeded on to work on the carbon pushrods.

Probably the only challenging aspect of the build that an average modeller may face is in the installation of the carbon pushrods as this is not common feature in most contemporary ARF's including foamies and park flyers. The only recent ones that I have ever encountered with this method of carbon linkage installation so far were in the E-flite Tensor 4D and PA Katana Mini.

However seasoned modellers should find this familiar "old school" method of pushrod construction with a modern twist by the use of carbon instead of wood pretty elementary. It's interesting bringing the old construction techniques into the use of modern space-age materials.

Installation of the Berg DSP 5 receiver was a simple process of connecting servos, wrapping the receiver in foam padding and inserting it into the left wing. This, along with the ESC helps maintain lateral balance by counterbalancing the battery pack and as such it is best to mount the electronics in the recommended positions indicated in the manual.

The antenna was then routed to the right wing and taped beneath using clear tape to keep a safe distance from the ESC which is mounted using rubbery double sided sticky tape that makes future removal easy.

The removable wings are then assembled using nylon bolts with the servo wires neatly hidden inside. Although there was mention of


The Chin-Touch! Just Too Much Fun!!

anti-rotation pins in an earlier section of the manual, the need for theses pins have been negated by the nylon bolts and as such is no longer included in the box.

The assembly of the horizontal stabilizer and elevator came next. This required cutting a slot at the aft of the fuselage, wide enough to accommodate the horizontal stabilizer assembly which is then patched back with the included balsa block. Very little sanding was required to align the horizontal stabilizer with the wings. The rudder was then assembled and ready for the pushrod assembly.

Both linkages were assembled using the method described above, however both rudder and elevator linkage assembly are a little bit tricky as it entails assembly of the rods in situ and has the potential risk to be prone to irreversible mistakes. Therefore care and pre-planning needs to be done upfront with a constant vigilant eye on the entire length of the linkage to ensure perfect alignment before CA is applied.

The last items in the list of assembly were the carbon landing gear (optional), tail skid and battery and the radio setup. Here is where I usually deviate from the manual as a matter of preference. The PCM9X was set for triple rates, the fist two being the recommended high-low conservative rates and the third, my personal preference (all maxed out) linked on single three position flight mode switch for convenience.

The Maiden Flight

As I could not wait for the weekend, I made it a point to maiden the Electric Shock on a Friday evening and I really don't know where to

INITIAL SETUP RATES

Control	Rate 1 (Low)	Rate 2 (High)	Rate 3
Aileron	Dual Rate 50% Expo 25% Throw 50% full travel	Dual Rate 100% Expo 25% Throw 100% full travel	Dual Rate 100% Expo 0% Throw 100% full travel
Elevator	Dual Rate 50% Expo 25% Throw 50% full travel	Dual Rate 100% Expo 25% Throw 100% full travel	Dual Rate 100% Expo 0% Throw 100% full travel
Rudder	Dual Rate 50% Expo 25% Throw 50% full travel	Dual Rate 100% Expo 25% Throw 100% full travel	Dual Rate 100% Expo 0% Throw 100% full travel
Mixing	None	None	None

begin. Prior to the flight, I had all intentions to conduct a structured method in flight testing, beginning with a conservative rolling take off, level flight to trim and proceed with basic aerobatic manoeuvres, the basic stuff you would read in most reviews. I did a quick routine pre-flight check and discovered that the HS55 servo on the rudder was not centring in-spite of adjusting the sub-trim and trim on the TX. It rested about 10mm either side of neutral. I almost felt like kicking myself in the behind for not checking this the previous evening. Not so good.

Since I was already at the flying field, I was not about to go home empty handed and all depressed. I needed my fix, well at least my plan at the time was to fly the Electric Shock high just to be on the conservative side of things and then later fix the servo at home. By hook or by crook, the Electric Shock had to be flown at least once as I was at that point bursting out of curiosity and excitement all at the same time. I had spent the previous two evenings building it and I just couldn't wait for the weekend anymore.

So with small cautious steps, on rate 1, I did a rolling take of and the Electric Shock was quick to get into the air, in a typical 3D airplane fashion. The PA Thrust 10 is powerful I though to myself while grinning at the thought of the oversized box the motor came in. PA must be trying to say, 'Small Motor, BIG Power!'

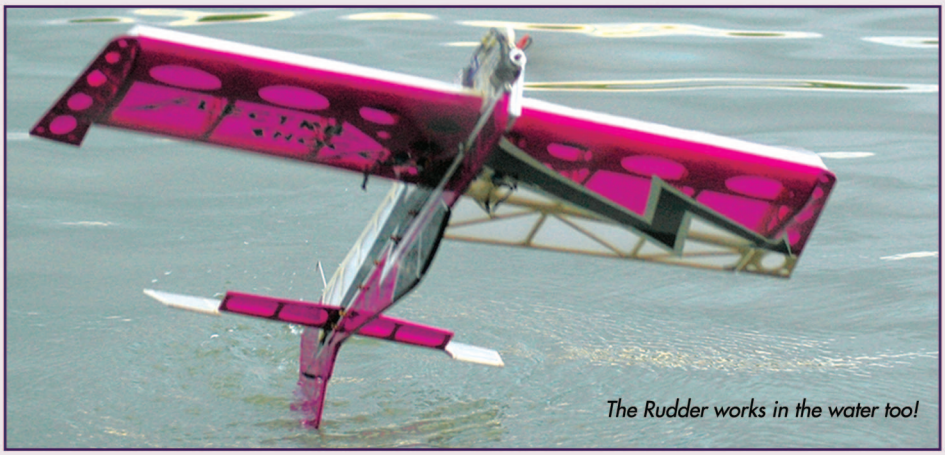
A quick circuit around the field with a couple of clicks on the aileron trim and the bird was now trimmed and flying beautifully despite the rudder servo being way off trim.

With the rudder having to be hand trimmed on the fly by means of the stick, I began my plan of executing basic manoeuvres to get comfortable with the plane, increasing the dual rates as I went to wring out any bad behaviour traits. There were none!

Since it had rudder servo problems, I did not test the knife edge capabilities as this would be difficult to judge at that juncture so I tried a hover and was immediately blown away by how stable it held a hover and had surplus power to punch out. It was effortless in a hover and executing tail touches were a walk in the park. The PA Thrust 10 combo is more than adequate and I would not change a thing.

The immediate impression I got was that the Electric Shock reminded me so much of a very good 3D foamie. This plane rocks! The hovers are easy or maybe too easy! It's very rare that I would execute a hover low and close to me or tail touch on a maiden flight but with the Electric Shock it was a rare exception. I felt that it was exceptionally easy to get comfortable with in such a short span of time. It usually takes me several flights over a few weekends to get comfortable with a new airplane but this was the exception to the rule. Somehow the Electric Shock has that same familiar "foamy" feel to it to a point where I totally forgot that it was balsa and was doing the things I would instinctively do on a foamie without giving a second thought, and within minutes of the take off the Electric Shock was flying very close to the ground.

The hovers are so stable that hand catches could be done on demand. Unlike some other 3D or freestyle airplanes, where you have keep working to stabilize the hover, the Electric Shock gets into a stable hover very quickly with almost no effort at all. Any pilot with rudimentary hovering skills would find absolutely no problems to execute the hover. I suppose PA is quite right about not including the landing gears in the box as the immediate impression I got was that you don't need it, if you could manage



The Rudder works in the water too!

a hover (Note: The landing gear was subsequently removed on the following day).

After so much fun on the maiden flight (a pretty long one too), I had to stop because it was getting dark and with only one 1000mAh pack, a recharge could not be done in time. Sigh! The Electric Shock is just simply addictive!

Eventually reaching home and suffering from acute Electric Shock withdrawal symptoms, I replaced the rudder servo and test flew again on the following day. With a good servo in place, it was ready to execute knife edge manoeuvres among other things. I found executing a knife edge harrier relatively easy and with the power of the Thrust 10, it could even manage a knife edge loop. That's a lot of rudder! The words "Got Rudder?" comes to mind. Without the recommended mix (which I deliberately did not set), it had a slight tendency to belly-in with a touch of coupling in fast and level knife edge department. However, the manual does explicitly explain how to deal with coupling in the Option Radio Setup section and as such is not a demerit in my assessment.

Rolling harriers were very easy to execute and this could be safely done low and slow. To be completely honest, I have never dared execute rolling harriers with balsa airplanes that low to the ground before, but somehow with the Electric Shock it just happened naturally. It is the "foamie feel" that had made me completely forget it is in fact a balsa airplane and I got very comfortable.

Flying in slow at high alpha with no hint of wing rock, both inverted and right-side-up harriers were simply flawless in spite of not using the recommended spoileron mix stated in the manual. Blenders and snaps were also relatively also easy to execute.

I finally managed to get an APC 10X4.7SF prop, which was the recommended prop to test on the following weekend. With the 10X4.7SF in placed, the Electric Shock was put though its paces of fast level flying, hard walls, snap rolls, hovers and square loops. I was amazed at how tight it could execute a square loop without dropping a wing. The APC10X4.7SF was perfect.

I must admit that I had a difficult time trying to keep focus on flight testing the Electric Shock and I frequently find myself digressing to just doing fun stuff instead of executing pre-planned set manoeuvres and documenting them. This happens on every flight which is one of the primary reasons why this review is way overdue!. Quite frankly the Electric Shock has got the word FUN written all over it and I am hooked. The only drawback is that I was having so much fun with the Electric Shock that my regular favourite airplane got sidetracked quite a fair bit!

Conclusion

All in all, the Electric Shock is certainly an excellent 3D airplane for anyone who either wants to learn 3D or for an experience pilot looking to hone their 3D skills or for anyone who just wants to have obscene fun. It is also an ideal alternative to 3D foamies. To be frank, having owned a similar 3D balsa profile model previously, I was initially a bit sceptical about the Electric Shock, besides, having owned a PA Katana Mini, I wasn't sure if PA could produce

another airplane that anyone or they themselves could beat to becoming my favourite. Now after having flown Electric Shock, I am glad I was proven wrong! It has also made it very hard for me to go ever back to 3D foamies again. And true to the words on the conspicuous yellow warning label at the side of the box, the Electric Shock is simply just too addictive. As a matter of fact, insanely addictive to point where I have had PA ship me another Electric Shock along with 5 additional battery packs for more Electric Shock "Therapy"!

FLIGHT TEST ASSESSMENT RATING

Manoeuvres	Rating	Grading Notes
Hovers	A+	Exceptionally easy to hold steady and controllable hovers with very little controller input.
Knife Edge	B+	Very slight coupling without TX aileron/elevator/rudder mix.
High Alpha Knife Edge	A+	Very easy to transition from hovering to slow high alpha knife edge.
Harriers	A+	Very stable and easy to execute on both inverted and right-side-up. Holds high alpha attitude with ease.
Walls	A	Easily execute walls and into a stable hover easily with no hint of snaps.
Hand Catch	A+	Executes hand catch on demand with ease.
Rolling Harrier	A+	Low wing loading allows easy, slow and smooth rolling harriers being able to be performed low to the ground.
Spins & Blenders	A	Effortless. Smooth transition into elevators.
Elevators	A+	Executes both inverted and right-side-up elevators very well along with smooth transition into harriers.
Inverted Flight	A+	Effortless.

OVERALL FEEL ASSESSMENT RATING

Criteria	Rating	Grading Notes
Fun Factor	A+	Fully loaded with FUN. Probably the only airplane of its kind with the highest fun factor I ever owned to date.
Ease of Beginners Learning to 3D	A+	Stable foamy like feel with added robustness much reduces the steep learning curve and builds confidence. Takes away the fear of flying balsa airplanes low to the ground.
Robustness	A+	Carbon Fibre reinforced balsa construction superior in robustness relative to conventional laser cut balsa. Exceptional lightweight construction reduces serious impact damage. Most mishaps are field repairable with CA.
Potential for Advance/Experts to hone 3D skills	A+	Stable foamy like feel coupled with agility offers a wide scope to improve 3D skills. Aircraft only limited by pilot's skills.
Ease of Assembly	A+	Balsa ARF style construction that requires less build time than most good foamies.
Manufacture's Combo Recommendations	A+	Manufacturer's recommendations are suited for optimal performance. Well balanced in flight duration and power and meets design intent.