



The following information relates to the construction / assembly of a HobbyKing AT-6 “Texan” – including what are considered (IMHO) to be reasonable and worthwhile modifications.

The specifics of the model as provided by HobbyKing are as follows:

Specs:

**Wingspan:** 1300mm

**Length:** 956mm

**Height:** 380mm

**Flying Weight:** 1350g

**Motor:** 760KV brushless outrunner

**ESC:** 30A brushless

**Servo:** 9g x 4, 17g x 2

**Battery:** 2400mAh~2700mAh (required)

**Propeller:** 11x8

Includes:

**User manual**

**Engine Sound Module System**

**All necessary hardware**

Requires

**6CH transmitter and receiver**

**3S 11.1V 2400~2700mAh lipoly battery**

## **PRODUCT ID: 9041000151**

Features:

- **Plug and Fly, simply add your own battery and radio system**
- **Engine Sound Module System included**
- **Fully functional split flaps**
- **Electronic servoless retracts**
- **High level of scale detail**
- **Ultra-durable EPO foam construction**

### **General**

The model is of good finish and pleasing appearance although some features of the construction and assembly leave a bit to be desired.

### **Manual / Instruction book**

Manual does not describe the model as it is purchased. Differences are to be noted with regard to the sound system in particular.

### **Issues Encountered on Assembly**

Speed control failed on powering up – replaced (by way of account credit) by HobbyKing,  
One flap servo inoperative on arrival - replaced (by way of account credit) by HobbyKing,  
Missing sound module mount - replaced (by way of account credit) by HobbyKing.

As noted above the manual provided seems not to be for this specific variant of the “Texan” which was also disappointing. The content of the manual specifically related to the sound system is not related to this model.

Both of these aspects have been referred to HobbyKing with advices from them that corrections will be made although as of compiling this note nothing has been noted on the website in the files section.

### **Build Record**

I have maintained a photographic build record of my construction of this model and whilst in no way do I feel it covers all the possibilities that may exist – or methods that might be utilised – I have done this to assist others in my recognising the shortcomings of the provided documentation and the difficulties they may cause.

A number of the modifications have been gleaned from other sources on the WWW with some of them copied / varied by myself in an effort to further improve the build and hopefully the longevity and flying capabilities of the aircraft.

This note is current as of October 7, 2013.

## Initial Flight

The aircraft has a maiden flight on September 23 – actually two flights – which were both without incident or issue.

All concerned onlookers were reasonably well impressed with the sound system output. The sound was in keeping with the speed and all agreed it was a good result.

## Tip Stall Incident

On the third flight a tip stall was experienced with the aircraft being damaged on impact.

The motor shaft was bent, various cracks in the foam were to be noted, the wing saddle was significantly moved with resultant damage / distortion.

Refer to the end of this build record for details / method of repairs.



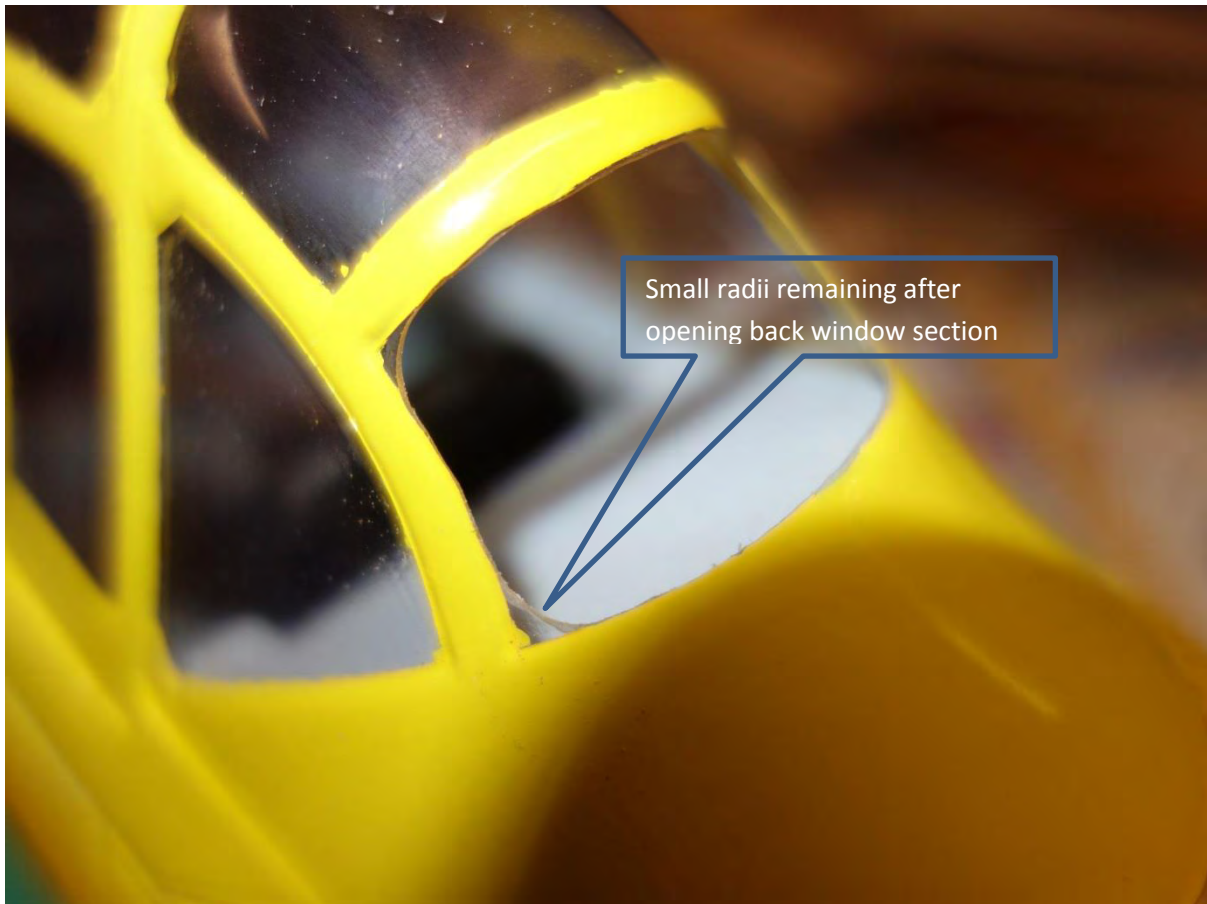
Pleasingly the wing spar modification proved to be impact resistant as initially – based on the experiences of others – the walk up to the aircraft on the ground was somewhat hesitant.

Cowl was damaged and one propeller blade broken off.

## MODIFICATIONS

### Canopy

The rear central window of the canopy was removed using a small Dremel grinding tip. This should assist in allowing additional heated air to be exhausted from the aircraft's internal spaces. It also allows air introduced by the propeller to be exhausted – without this the canopy will overcome the magnetic catch and lift – if not be lost.



*Small radii in corners can be noted – from a distance the opening is hardly noticeable.*

### Wing Spars

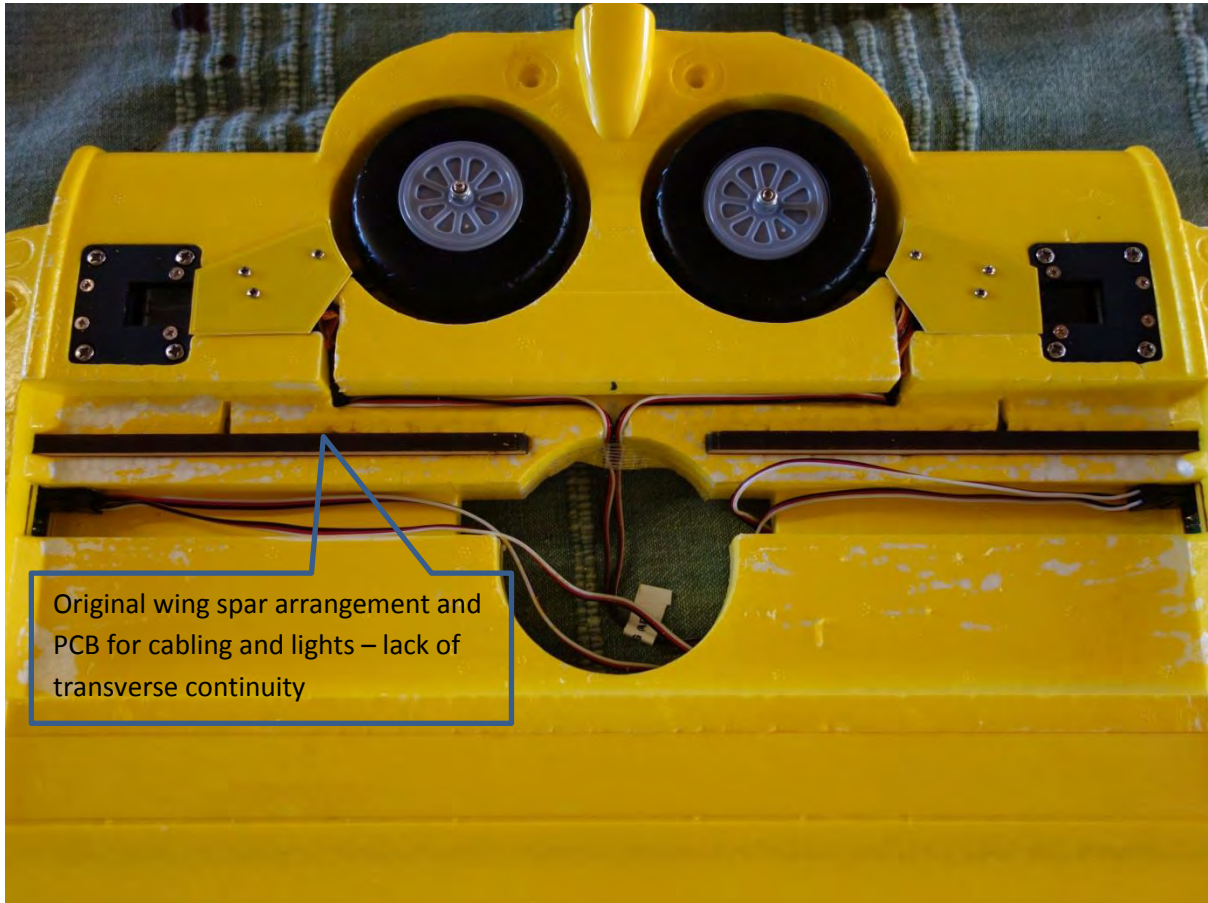
The wing spar arrangement has been the subject of much criticism and a number of various proposals to modify the original arrangement. Whilst the method I have applied may not be best available it must be borne in mind that one does not set out – on receipt of a model from a supplier- to essentially redesign the entire aircraft.

In many instances any modification will be a compromise.

Given the anecdotal information with regard to wing and wing surface failures an approach has been taken to strengthen the wing attachment method and at the same time allow for the actual wing sections to be capable of removal.



The wing “saddle” structure was examined and the foam insert covering the underside of the saddle was carefully removed. This centre section is attached solely with contact cement (possibly deliberately as to allow repairs) and was removed. This exposes the cable channels below.



***This photograph indicates the original arrangement of the spars and the cabling exposed once the cover panel is removed.***

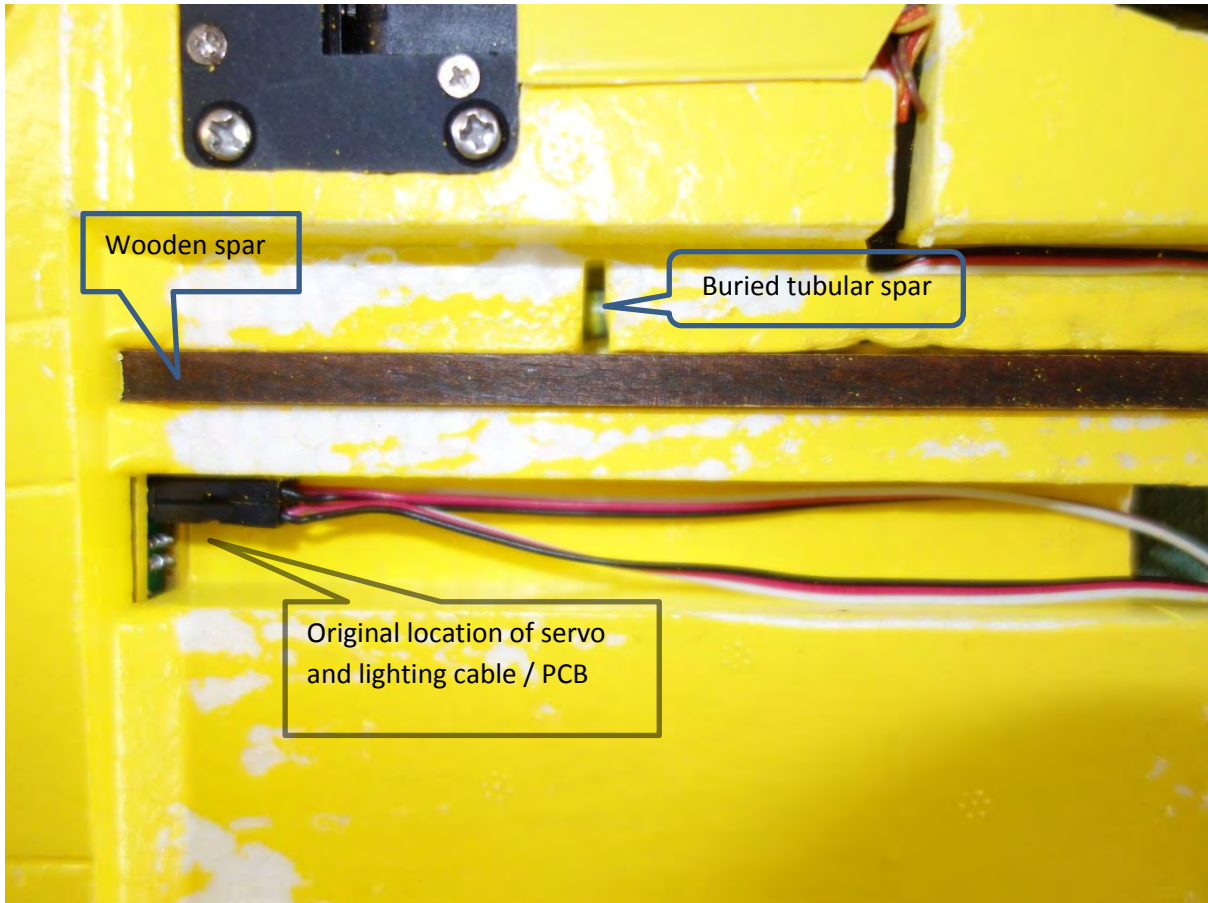
There is unacceptable bending of this section as the spars do not meet at the central point.

There is a small diameter auxiliary spar buried in the foam (looking down into the small “slit” area and the central cable passage for the landing gear cables this can be seen) and it is between this tubular auxiliary spar and the wooden spars that the modification was effected.

Maintaining the wooden spars firmly onto the aft side of the spar slot the foam between the wooden spars and the tubular auxiliary spar was carefully removed down to the depth of the recess for the wooden spars.

The foam removed included the foam between the inboard ends of the wooden spars.

This encroaches slightly on the circular opening for the speaker although this is not an issue as will be noted later in this write up.



***The space between the buried auxiliary spar and the wooded spar – in the original arrangement can be easily seen in this photograph. It is the space between the wooden spar and the rod that is used to accommodate the CF reinforcement.***

Once the channel is cleaned out and uniform – not really a difficult task a section of carbon fibre is introduced into the opened channel.

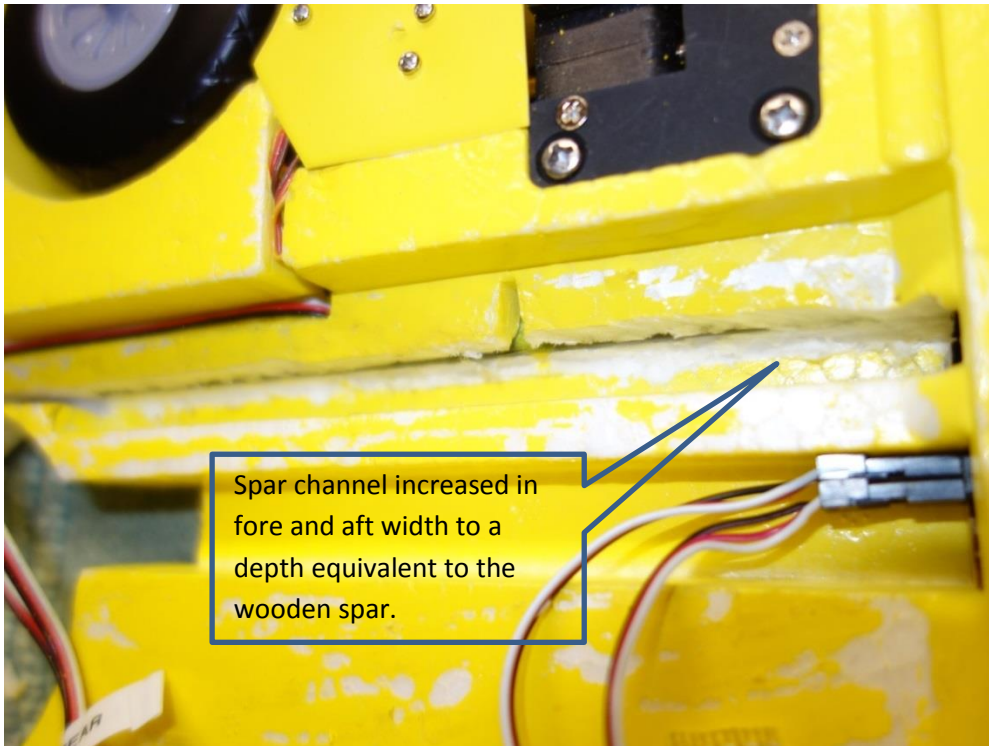
The carbon fibre section used was 10mm x 2 mm thick the overall length being approximately 400mm in one continuous length.

This is inserted into the new “gap” on the forward side of the wooden spars.

The length of the carbon fibre section was arranged so that it terminates outside the central “saddle” such that when the wing sections are slipped onto the wooden spars about 30mm of the carbon fibre section is actually within the wing section itself.

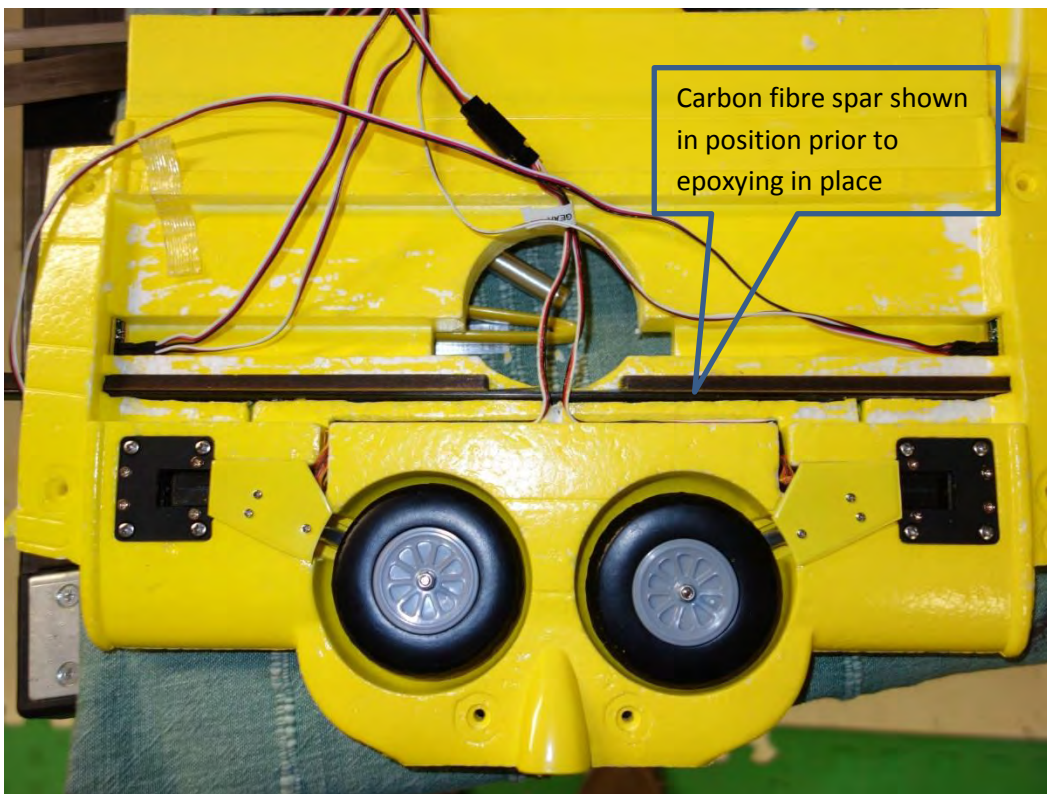
To facilitate easy inserting of the wing section onto the spar / carbon fibre section the outermost part of the carbon fibre is carefully ground down as to present a taper to the opening in the wing when fully pushed onto the spar.





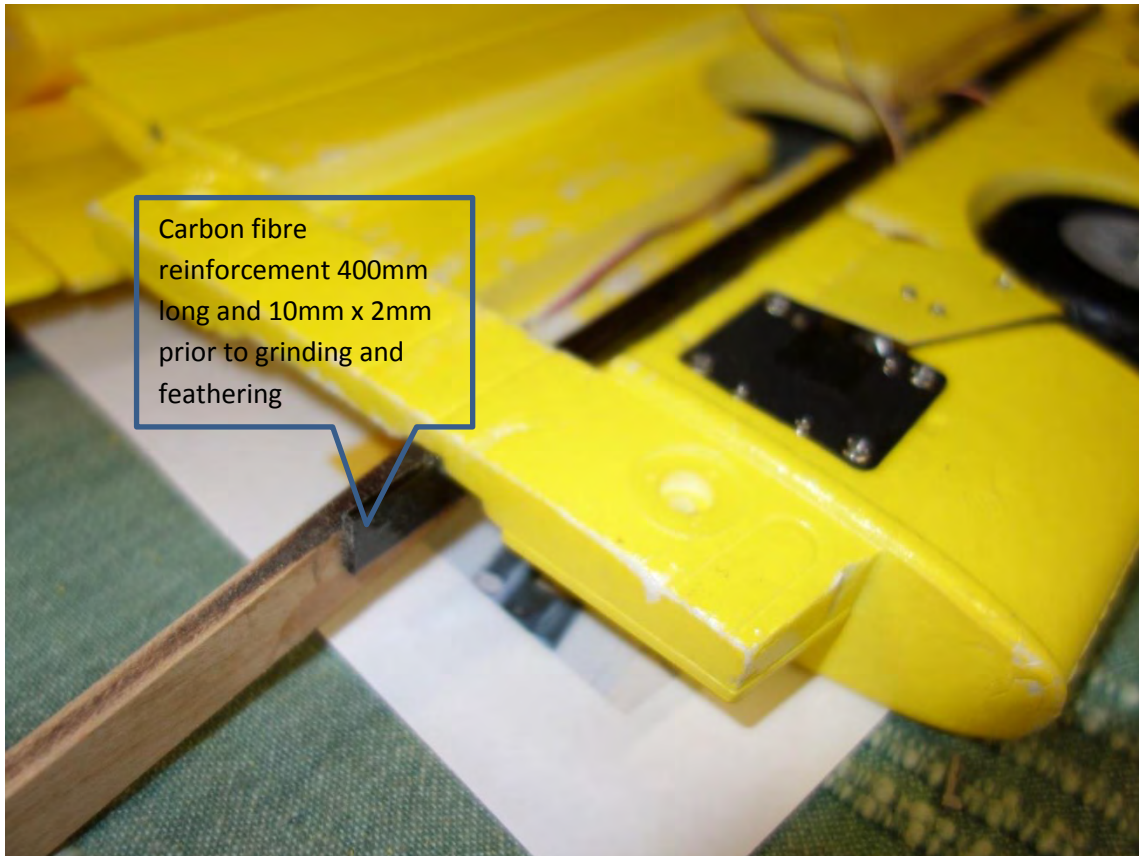
Spar channel increased in fore and aft width to a depth equivalent to the wooden spar.

*This photograph indicates the channel created to house the carbon fibre reinforcement*



Carbon fibre spar shown in position prior to epoxying in place

*This photograph indicates the temporary fit up of the carbon fibre section in the channel area before epoxy gluing. The carbon fibre can be seen extending to the left of the central wing saddle.*



***This photograph is included to indicate the extent of the additional carbon fibre spar reinforcement outside the wing saddle.***

Whilst the wooden spars demonstrate dihedral the additional carbon fibre reinforcement is straight.

The part of the carbon fibre above the top edge of the wooden spar is carefully ground away and then the end of the reinforcement tapered by grinding to reduce any abrupt change in section..

The spar opening in each wing panel is then enlarged slightly to accommodate the thicker reinforced (now) composite spar.

Carbon fibre utilised was 400 mm long and 10mm x 2 mm thick.

### **Wing Saddle Cover Plate**

The underside of the wing saddle is provided with an EPO cover plate contact glued in place.

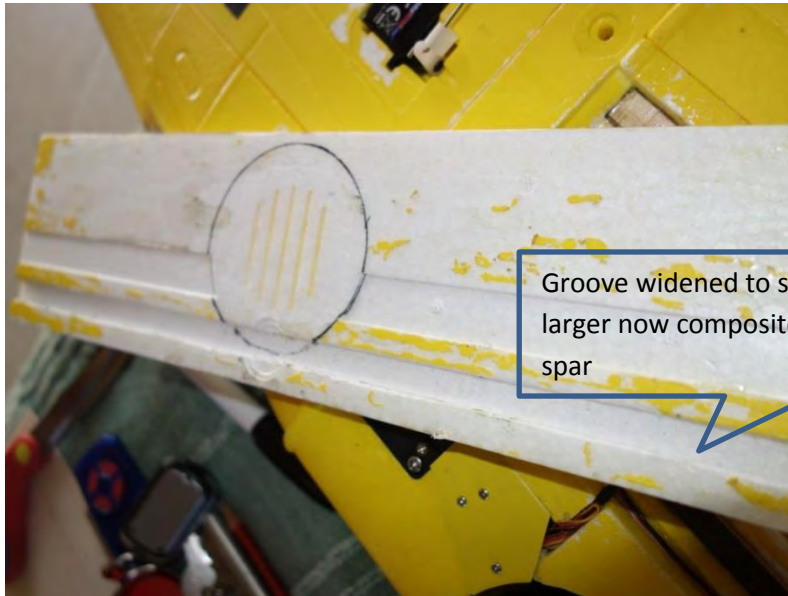
This should was carefully prised up and gradually removed in one piece.

This is a major part of the improvement of access with this model – in my view – as it enables access to all cables – control and lighting – without having to remove the wings. It also allows the sound module cables and the landing gear cables to be grouped together and passed up in to the cabin area for connection to the receiver.



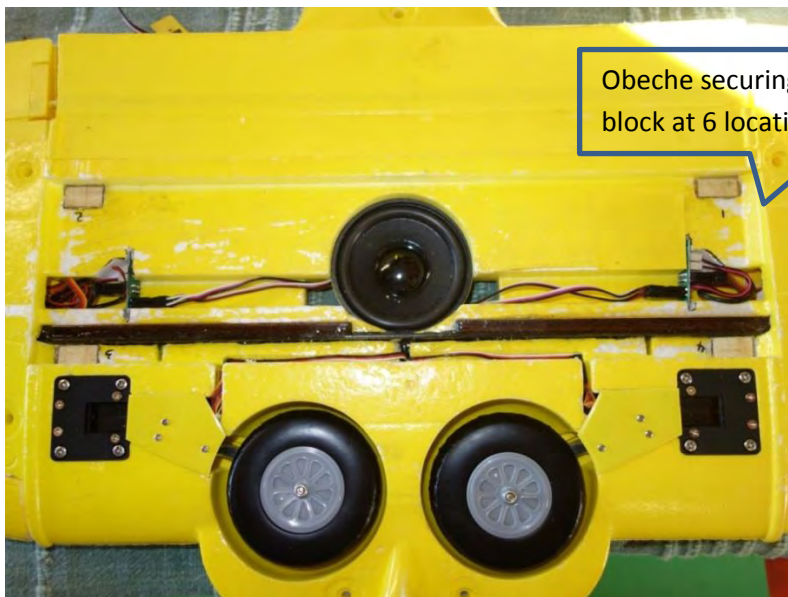
This means that all controls are readily accessible from within the cockpit area once the rearrangement is complete.

The enlargement of the groove in the cover plate must be done to maintain the same level as original as the carbon fibre reinforcement finished upper edge is above the original wooden spar.



***The channel immediately above the original wooden spar is widened to accommodate the wooden spar plus the carbon fibre insert.***

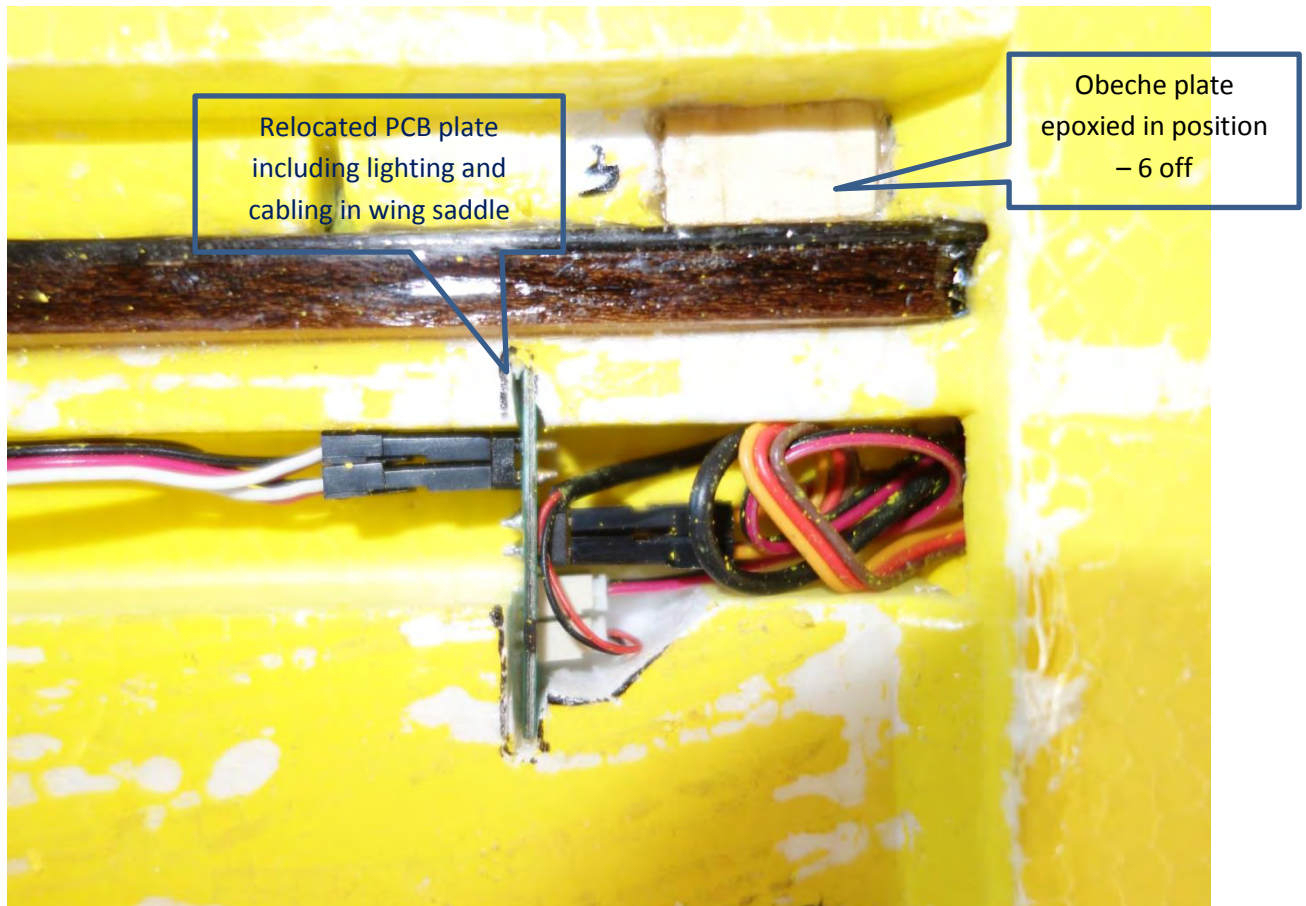
The diameter of the speaker is marked onto the cover plate for reference purposes as consideration is being given to opening up the free are area for transmission of sound.



***Carbon fibre spar epoxied in place – note four obeche inserts for screwing cover in place – two additional inserts were fitted at mid width of the cover – above and below the speaker in the photograph***

## Rearrangement / Relocation of PCB Junction Plates and Associated Cables / Plugs

To facilitate access the PCB junction plate attached on the outboard sides of the central wing saddle have been relocated to be inside and beneath the wing saddle cover plate.



### ***New location of PCB plates in wing saddle and not on removable wing section***

By removal of the six screws (screwed into the obeche inserts) the cover plate is removed and all servicing and checking can be made without recourse to wing / wing saddle removal.

The wings can remain assembled (or easily removed as a unit if required for transport or other personal reason) but in any case it becomes unnecessary to have to remove and refit the PCB connections – if they were to remain in their original locations - each time the wings are removed from the aircraft.

All that is necessary is to detach the usual type plugs between the wing saddle and the receiver located in the cockpit.

If the wing / saddle unit **MUST** be removed from the fuselage then the PCB – inserted in a slot in the wing saddle – can be easily removed – the plugs disconnected and the wings detached from the saddle.

At a wingspan of 1300 this should only be required if damage has occurred.

## **Access From the Lower Sections of Fuselage to Cockpit Areas and Strengthening of Cockpit Sides**

In the absence of correct detail for installation of the sound module a reassessment of space was made within the fuselage by carefully introducing some openings in the “floor” area between the forward cockpit area and spaces immediately below.

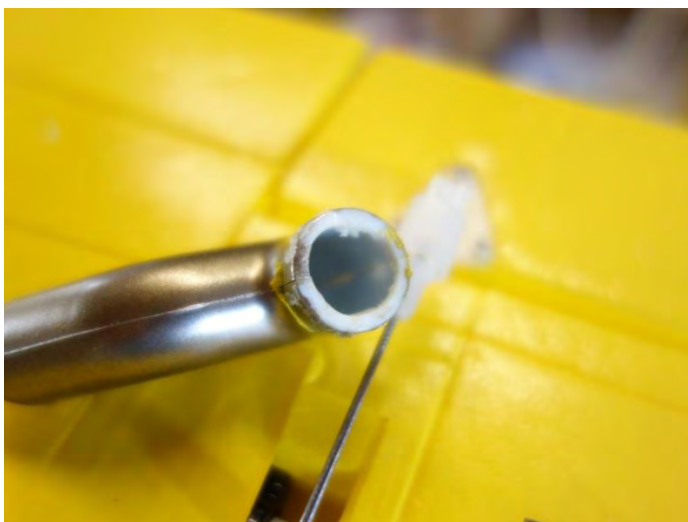


***Opening in fuselage to allow easier access of cabling and better ventilation / air flow***

At the same time cooling air entry locations were examined and some alterations effected.

### **Dummy Exhaust Pipe**

The dummy exhaust pipe was carefully removed from the model – it is held in place with contact adhesive - the cowling and the motor had been previously removed – and the pipe was cleared of foam – very carefully – as was the area between the inboard end of the pipe and the internals of the aircraft.



***Exhaust pipe cleared on foam***



Similar rework was carried out of the cowling on the side of the fuselage.

This was a little more difficult but again careful probing and cutting with very small blades saw this cowl becoming a clear airflow path into the body of the fuselage.



***Opening in fuselage continued internally as to allow air flow from internal annular space immediately behind propeller***

There is now the possibility of air flow – exhaust – from the pipe.

### **General Ventilation**

Two openings were enlarged / provided in the “floor” of the cockpit area as to provide air movement and cable access between the two areas.



***View from underside indicating openings introduced and the underside of the sound module support ply plate***

Where these openings were made the transverse and longitudinal sides of the openings were strengthened with 10mm x 0.5 mm carbon fibre epoxied in place.

### **Air Scoops – Lower and at Side**

Each of these were cleared of any foam within the openings and the fuselage internally opened up (carefully) as to allow air flow to internal spaces.



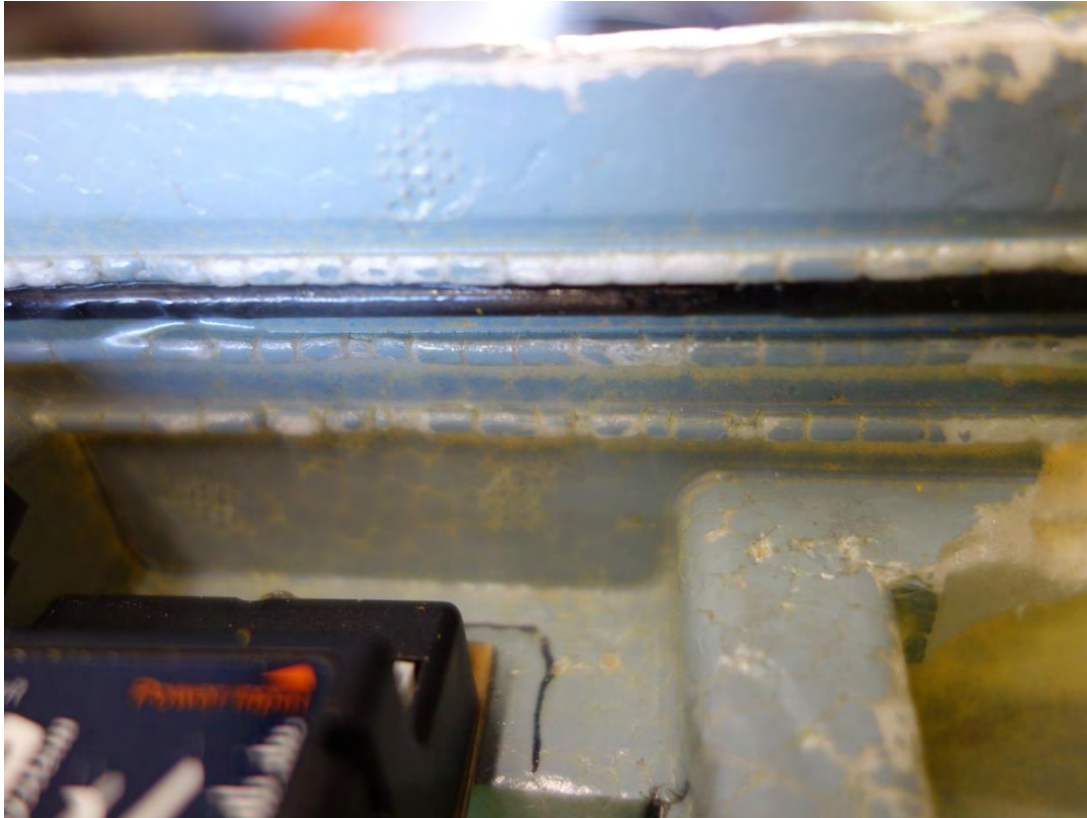
***Lower inlet scoop opened up***



***Side inlet scoop opened up***

## Fuselage Side Strengthening

The cockpit sides were strengthened by placing a section of carbon fibre tube along each side immediately below the canopy rail.



***Carbon fibre rods epoxied to sides of fuselage***

These rods were about 350 mm in length of 3 mm diameter and were epoxied in place into existing grooves as can be seen in the above photograph.

## Wings

Each wing - it seems – is comprised of about eight separate sections seemingly all put together with contact adhesive. Whilst this will give some flexibility (perhaps too much) there is a case to stiffen up some of the panels.

With this in mind white fibreglass reinforced tape was placed along a number of joins.

In an attempt to restore the yellow colour a second taping of translucent yellow wing tape from HobbyKing as also mentioned elsewhere was applied.

The end result is not too bad – the yellow tape in two layers is as good as the equivalent yellow.



As also mentioned elsewhere another yellow that is very close to the airplane colour as presented is Epsom colour printer yellow cartridge (140) in two coats – hardly notice any paint line.

### **Dummy Radial Engine**

The foam between the cylinders of the faux engine was carefully removed as to allow increased airflow past the motor and the ESC.

Where the foam was cut the white foam exposed was painted flat black as was the “hidden” forward section of the fuselage / nose area.

When the engine and cowling were replaced the black “background looks quite effective.

### **Cowling**

Fibreglass reinforced tape has been laid internally within the cowling to give it a bit more strength and flexibility and hopefully an increased life.

A small piece of silicon fuel tube was placed on each of the two screws to soften the attachment point when tightening and also to provide a little movement which will occur,

### **Pilot**

The green hair of the pilot was painted black, his jacket brown and his trousers navy blue.

The screw securing the pilot (ouch) was removed and the pilot becomes a loose fitment retained in his seat by an elastic band.

Part of the foam on the canopy underside at the front where it keys into the fuselage was trimmed away as to allow the canopy to be fitted when the ESC / battery are fitted and also provide a close clearance on the pilot’s legs.

The final arrangement is to slide the battery (am using the battery pushed well forward into the provided (unchanged) battery slot then place the pilot in the forward seat.

When the canopy is slipped into place the canopy applies pressure to the pilot’s feet and secures him firmly in place as the magnetic catch aft clicks securely into positive contact.



*The pilot's feet provide further assistance in that when the canopy is secured the pilot's feet securely hold the battery in location.*

No Velcro is used.

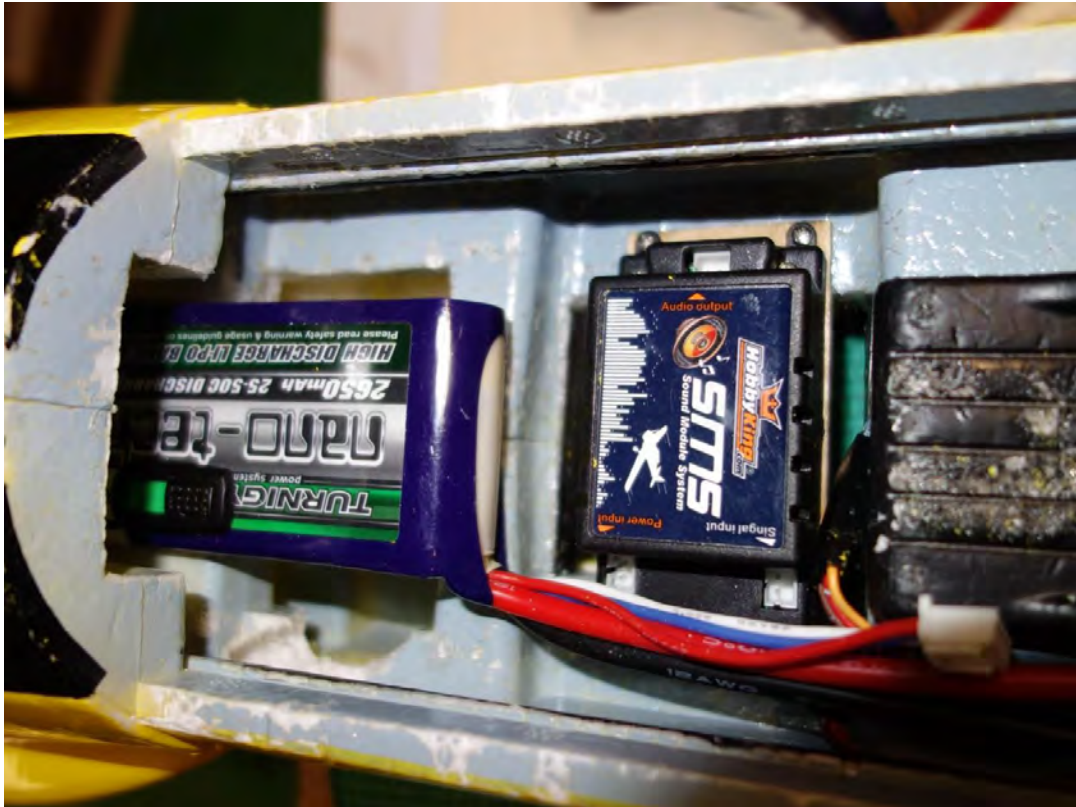
### **Sound Module**

A ply wood plate was made – 1.5 mm ply –about 75mm x 35mm - onto which the sound module is secured.

There was meant to be a wooden plate provided (as per the “manual”) but that was missing.

CA is used in the screw holes to assist in strength.

The plate with the sound module attached is then secured across one of the new openings made in the “floor” between upper and lower spaces of the fuselage.



*The sound module cables and other cables are immediately below the module and connection is very straight forward given the easy access now afforded with the additional openings.*

### **Receiver**

The receiver is mounted on the floor immediately in front of the aft seat in the cockpit. Again cable access is now reasonably generous. With the receiver visible in the cockpit binding is more straight forward.

### **Electronic Speed Control**

The original ESC failed on powering up and was replaced with a Turnigy Plush 40 ampere unit which is slid into the original location.

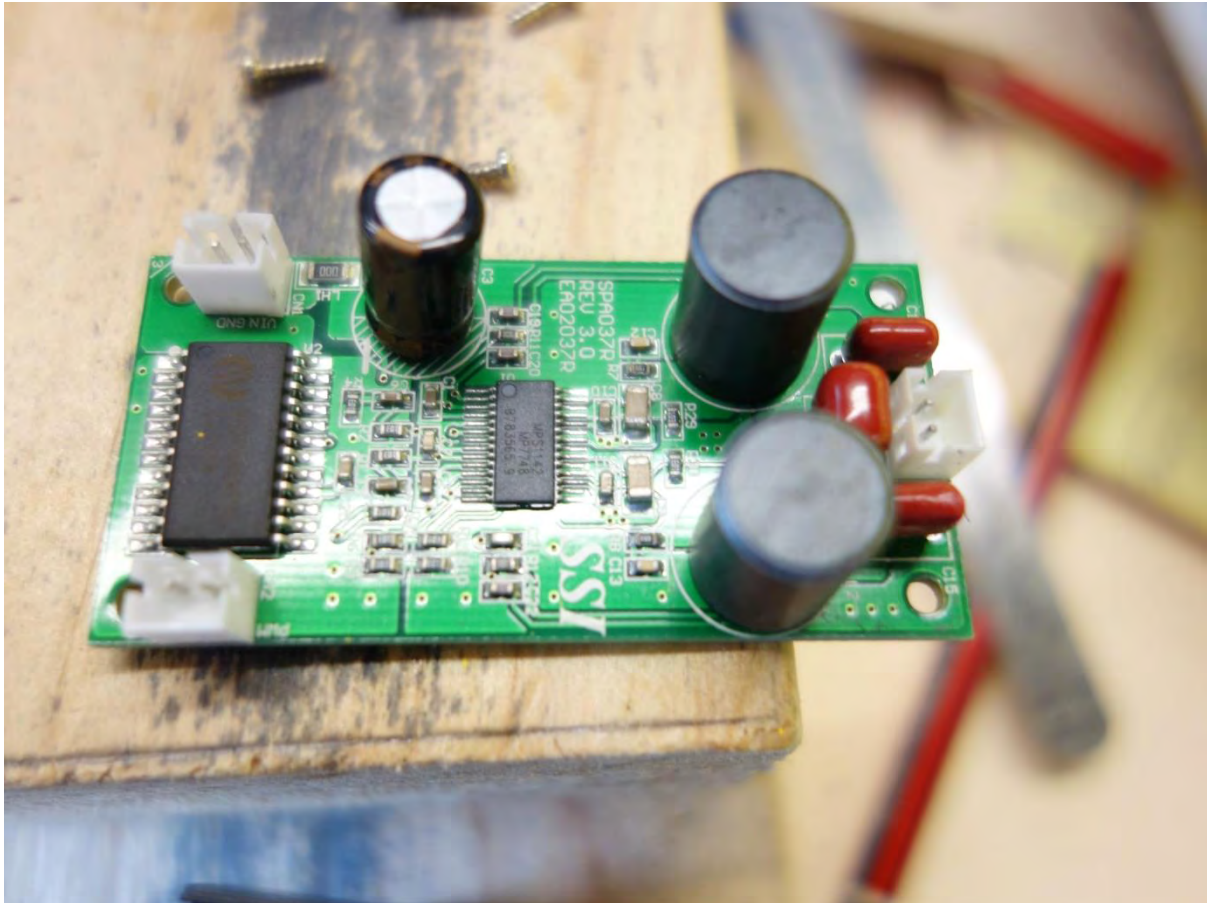
The Plush ESC unit is a little larger and is as a result a bit tight in place but increased air flow in the area should minimise heating issues.

### **Servos**

One flap servo was DOA so both were replaced with HobbyKing 928BB units.

For information investigation as to the details of the original flap servos - with HK – indicated that the originals are Turnigy TSS - 9S slow speed servos.





***Sound Module with cover removed***

Curiosity got the better of me so I removed the sound module cover to inspect.

There is no volume control that I recognise as such.

The cover was refitted.

Cabling of the module is straightforward and there is now additional information on the HK website although reference is still made to volume control. Not sure where the heat sink is either.

Information is located at “hardware and accessories/ audio systems and parts” in the files section for the PNP Engine Sound Module System.

## **FINAL WEIGHT**

**Final weight of aircraft was 1620 grams with the Donkey style motor fitted.**

Donkey style motor weight is 136 grams.

This weight includes the battery – see above – the pilot and the modifications effected as described above including revised battery size and larger ESC.

## **POST INCIDENT**

### **Repairs**

#### **Spare parts**

There are no spare parts for the “Texan” known to be available from HobbyKing although there are some for other models. I feel this is a missed opportunity for HobbyKing as without doubt customers would purchase them. Some of the OEM’s for the various other models DO make spare parts – for example Duraflly for one - but for others they are somewhat difficult to source. The fact that they are available for Duraflly shows it IS possible. Come on Hobby King – your loyal customers will purchase them !!

#### **Propeller**

The broken propeller blade was placed with one of the supplied spare blades – spare blades but no others ?

#### **Cowling**

The cowling – light plastic construction – reinforced as a modification by fibre tape saved it’s life in my opinion – was damaged and holed on the underside. HobbyKing yellow tape was used externally to cover the holes made in the cowl when it impacted. The yellow is as good as identical particularly when a few layers are used.

#### **Fuselage**

Generally all foam fractures have been repaired utilising foam safe cyanoacrylate.

The carbon fibre stiffeners added to the sides of the fuselage within the cockpit became detached in the incident. These have been re epoxied in place – it is always somewhat difficult to properly secure CF onto the surfaces of foam.

#### **Battery Securing**

Whilst the pilot could sit in the front seat and “rest” his feet on the battery – holding it in place - (it being a Turnigy Nanotech 2.56MaH 25/50C – which slides down into the battery slot perfectly) there seems now to be some residual some compression in the foam and this is not now possible. The battery is now held in place with a foam wedge and the pilot stays on the ground.

#### **Motor**

The motor shaft was bent in the incident.

The original motor was a designated on the can as being a HobbyKing CT3511-760kV motor and access to the HK website was unsuccessful in identifying this motor.

It was noted that the shrink tube on the motor power cables was marked as ST 3511 760.

Search of the HobbyKing site indicated that there are four HobbyKing Donkey ST series Donkey motors none of which corresponded with the marks on the motor removed.



*During the time that this searching was going on an alternative motor (in the spares box) has been fitted – a Scorpion 3008 – 1220kV.*

To allow installation a 3mm thick aluminium plate was been fitted to the ply bulkhead and the plastic offsetting motor mount reused as to maintain the thrust lines. The motor is directly attached to the aluminium plate.

A larger collet to suit the 5mm Scorpion shaft was fitted and the original propeller retained.

### **Wing Structure**

No damage was occasioned to the wings themselves or the spar reinforcement arrangement. Whilst the wing saddle did suffer some distortion this was almost totally removed by thumb massaging the foam after applying hot water wetted cloths to the saddle – numerous times. Gradually – very - the distortion in the saddle was removed

### **Adjusted Weight**

Weight as modified for propulsion was 1586 grams including Scorpion motor and seating plate weighing a total of 102 grams.

### **Subsequent Flights**

Aircraft as repaired was flown October 7 without issue.

Sydney, Australia October 7, 2013