



# **SIAI Marchetti SF-260**

## **Construction Manual**



**Version 1.0**

**January 2013**

### General information for SIAI Marchetti SF-260



### SIAI Marchetti SF-260

The **SF-260** is one of the world's most revered military trainers, with some 880 aircraft in service and 27 different military customers around the world. It was, and still is, marketed also as an aerobatic plane as well. Stelio Frati (the F in **SF-260**) designed this airplane in the early 60s for Aviamilano, which was later purchased by **SIAI Marchetti** (the S in **SF-260**). It is powered by a 260 hp 6-cyl Lycoming engine (denoted by... yeah, right, the 260 in the name...).



The flight characteristics, performance and style of the **SF-260** are second to none, making it a favorite not only of military flight schools, but of airshow pilots, civil professional flying schools, and anyone who loves fast, beautiful, great-flying airplanes.

When CARF was looking for something different, something, which we wouldn't see on every model airfield or show event, we were looking at the **SF-260** for several reasons:



- it looks like a great sport flyer with sufficient wing area, tricycle gear and large cowling for a vast variety of engines. The wing tip tanks make it even look "sexy".
- due to the retractable landing gear it is a very clean looking and flying plane, but the gear itself is set up very simple, making it a great first experience with large scale retracts
- air foil, control surfaces, leverages and general configuration as a low wing sport plane, make it a great aerobatic trainer as well. A perfect sight within the uniformity of Extras, Yaks and Edges, doing almost everything these modern Aerobats would do in classic routines.





- Even for glider towing this airplane is perfectly suitable. With a powerful engine it pulls gliders up to 25 kg safely to altitude and the towing pilot can have some serious fun making his way down to the ground for the next one waiting in line.

- Just by the looks the SF-260 already represents a slick, fast airplane. Almost Jet like it can be flown through its paces, with an extremely wide range between top speed and stall speed. CARF picked the right airfoil for the task, that's for sure.

- Last but not least, there are plenty of military and civilian, colorful schemes available, so that there will be something for the taste of everybody. It also wouldn't look bad in a Fantasy Scheme, too...



So, there was no way past doing this airplane one day. Motivated by a full scale **SIAI Marchetti SF-260** pilot, Ralf Niebergall, CARF took over a half finished project from a small company in Germany, AeroFlug. In due course, most of the aerodynamic design had been re-done in CAD, wings and stabs CNC-milled for precision, so that the first flight of our model didn't surprise us at all:

It just is another example of great CARF engineering, showing its qualities right at the first fly by. Its structural integrity, high prefabrication, detailed surface structure and straight forward mechanical solutions make it a pleasure to build, to fly, and to pose with at your local club field, as well as on a highly decorated show event.



#### Left Pictures:

Father and Son **Airshow Team Ralf and Nico Niebergall**. Nico is flying our 1/3<sup>rd</sup> scale SIAI Marchetti SF-260.

# Instructions for SIAI Marchetti SF-260

Thank you very much for purchasing our CARF SIAI Marchetti SF-260.  
This composite model aircraft was manufactured by using Vacuum Sandwich Technology.

The Instruction Manual is freely downloadable from our website (www.carf-models.com), with all the hi-resolution photographs in full color. Please note that you might see a few small differences between some the wood parts shown in the photos here, as they are prototypes, and the final cnc-milled parts supplied in your kit.

Before you get started building and setting-up your aircraft, please make sure you have read this instruction manual several times, and understood it. If you have any questions, please don't hesitate to contact us. Below are the contact details:

**Email:** [jbZ4 WfZa cXYg'Wta](mailto:jbZ4 WfZa cXYg'Wta)

**Telephone:** Phone your CARF Rep!!! He will be there for you.

**Website:** <http://www.carf-models.com>

## **Liability Exclusion and Damages**

You have acquired a kit, which can be assembled into a fully working R/C model when fitted out with suitable accessories, as described in the instruction manual with the kit. However, as manufacturers, we at CARF are not in a position to influence the way you build and operate your model, and we have no control over the methods you use to install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect application and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of the CARF Models company to pay compensation is excluded, regardless of the legal argument employed. This applies to personal injury, death, damage to buildings, loss of turnover and business, interruption of business or other direct and indirect consequent damages. In all circumstances our total liability is limited to the amount which you actually paid for this model.

### **BY OPERATING THIS MODEL YOU ASSUME FULL RESPONSIBILITY FOR YOUR ACTIONS.**

It is important to understand that CARF-Models Ltd, is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation and maintenance of the aircraft, nor whether you install and use the radio control system correctly. For this reason we at CARF are unable to guarantee or provide a contractual agreement with any individual or company that the model you have made will function correctly and safely. You, as operator of the model, must rely upon your own expertise and judgement in acquiring and operating this model.

## **Supplementary Safety Notes**

### **Pre-flight checking:**

Before every session check that all the model's working systems function correctly, and be sure to carry out a range check. The first time you fly any new model aircraft we strongly recommend that you enlist the help of an experienced modeler to help you check the model and offer advice while you are flying. He should be capable of detecting potential weak points and errors.

Be certain to keep to the recommended CG position and control surface travels. If adjustments are required, carry them out before operating the model.

Be aware of any instructions and warnings of other manufacturers, whose product(s) you use to fly this particular aircraft, especially engines and radio equipment.

Please don't ignore our warnings, or those provided by other manufacturers. They refer to things and processes which, if ignored, could result in permanent damage or fatal injury.

## Attention !

This large-scale aircraft is a high-end product and can create an enormous risk for both pilot and spectators, if not handled with care, and used according to the instructions. Make sure that you operate your Model according to the AMA rules, or those laws and regulations governing the model flying in the country of use.

The engine, servos and control surfaces have to be attached properly. Please use only the recommended engines, servos, propellers, and accessories supplied in the kit.

Make sure that the 'Centre of Gravity' is located exactly in the recommended place. If you find that you need to relocate your batteries or even add weight in the aircraft to move the CG to the recommended position, please do so and don't try to save weight. A tail heavy plane, in a first flight, can be an enormous danger for you and all spectators. Fix any weights, and especially heavy items like batteries and fuel tanks, very securely to the plane.

Make sure that the plane is secured properly when you start the engine. Have at least 2 helpers hold your plane from the tail end, or from behind the wing tips, before you start the engine. Make sure that all spectators are behind, or far in front, of the aircraft when running up the engine.

Check for vibrations through the whole throttle range. The engine should run smoothly with no unusual vibration. If you think that there are any excessive vibrations at any engine rpm's, **DON'T FLY** at this time and check your engine, spinner and propeller for proper balancing. The low mass of all the parts results in a low physical inertia, so that any excess vibrations could affect the servos and linkages.

Make sure that your wing tubes and stab tubes are not damaged. Check that the anti-rotation pins for the horizontal stabilizer are located correctly in their holes, and are not loose. Check that all linkages and clevises are securely connected to their respective servos and control horns.

Check that the M6 wing retaining bolts are tight, that the M3 bolts retaining the horizontal stabilizers on to the carbon tube are installed and tight, and that the hinge tubes for the rudder and elevators cannot come out.

Make sure that you range check your R/C system thoroughly before the first flight. It is absolutely necessary to range check your complete R/C installation first **WITHOUT** the engine running. Leave the transmitter antenna retracted or use the especially range reduction-function of your 2,4MHz-Radio, and check the distance you can walk before 'fail-safe' occurs. Then start up the engine, run it at about half throttle and repeat this range check with the engine running. Make sure that there is no range reduction before 'fail-safe' occurs. Only then make the 1st flight. If you feel that the range with engine running is less than with the engine off, **DON'T FLY UNTIL YOU FIND OUT THE CAUSE!**

If you don't find the cause please contact the radio supplier and the engine manufacturer and **DON'T FLY** at that time.

If you carefully checked all the points above and followed our advice exactly, you will have a safe and successful first flight - and many hours of pleasure with your CARF SIAI Marchetti SF-260.

## **General information about fully-composite aircraft structure and design**

All the parts are produced in negative molds, manufactured using vacuum-bagged sandwich construction technology. All parts are painted in the moulds, either single colour or designer colour schemes. The production method enables us to present this aircraft with incredible built-in strength, while still being lightweight, and for a price that nobody could even consider some years ago. This production process has huge advantages, but a few disadvantages as well. These facts need to be explained in advance for your better understanding.

### **Description of Parts**

#### **The Wings:**

Both wing halves are made in negative moulds, fully vacuum-bagged, using only 2 layers of cloth in combination with a hard 2mm foam sandwich to form a hard and durable outer skin. Because of this technology no additional structural parts are needed except for the main spar tubes, and the integrated landing-gear mounts.

The ailerons and flaps are already hinged for you. They are laminated in the wing mould and are attached to the main wing with a special nylon hinge-cloth, sandwiched between the outer skin and the foam. This nylon hinge is 100% safe and durable. You never have to worry about breaking it, or wearing it out. There is no gap at all on the hinge-side surface, and there is a very narrow slot on the opposite side, where the control surface slides under the wing skin. This hinge method is the cleanest you can ever obtain, but you have to take some care during assembly for proper installation and servo set-up. The aileron is top-hinged, and the flaps are bottom-hinged - with the molded flap gloves already attached, trimmed and painted for you at the factory.

The wings are manufactured with recessed servo covers and hatches for 1 servo per aileron. The flap servos are installed in milled plywood mounts that are screwed to the plywood rib, close to the main wheel bay. We recommend a high-torque standard size digital servo for both the flaps and ailerons in each wing. Our servo hatches and milled plywood mounts make both, installation and exchange if necessary, very quick and easy and provide a rock solid servo mounting and linkage system. Both Flap and aileron control surface horns are preinstalled.

The main landing gear mounts are constructed from milled carbonfibre plates and plywood, and are fully integrated into the spar tube system during the molding process, providing an extremely rigid system.

The wings are attached to the fuselage with 1,5 x 40mm diameter aluminum alloy tube, and retained with a single M6 x 30mm socket head bolt that is screwed through the plywood wing root rib into a T-nut in the fuselage - accessed through the main wheel bay with a ball-ended allen wrench. This wing tube spar system is strong, and already tested during many flights of the prototype and similar models - so please do not modify it in any way !

#### **The Fuselage:**

The fuselage is also made in negative moulds, and is all constructed using state of the art technology. All the loadbearing internal parts are installed during manufacture, to ensure accurate location and reduce your assembly time.

The molded carbon tubes in the fuselage that receive the wing tube, the carbon stab spar tube, and the holes and reinforcement plates for the anti-rotation dowels, are already installed and aligned. There is no need to even check the incidences - you can be assured that these are already set in the molds so that no adjustment is necessary.

The lightweight fin-post has 4 phenolic hinge posts already installed and aligned for you. Just slide in the 4mm brass tubing for a perfect 'scale' hinge.

The molded carbon motordome is already trimmed for you at the factory, and provides a rigid mount for the current motors. Please mount your chosen motor to the mount using the instruction is included in the motor section here - and follow the latest motor manufacturers recommendations about this exactly.

The nosegear mount is also pre-assembled for you, bonded into the bottom of the carbon motor mount and is more than strong enough for even less-than-perfect landings! [Bild?](#)

The 2 part cowling is also pre-assembled during manufacture, with the main of the fixings already completed.

### The Stabilisers:

The stab parts are also vacuum bagged sandwiched construction, with the control horns and hinging completed for you. The rudder is hinged with a 4mmØ brass tube, and the elevator control surfaces are hinged with 4mmØ aluminum tubes, all fitted through 4 phenolic hinge bearing plates which are jig-installed during manufacture for perfect alignment.

All the structural parts are preinstalled. The horizontal stabs are mounted with a 20mm diameter aluminum tube and one 10mm carbon anti-rotation pin each.

### Servo Screws:

Fix all the servos into the milled plywood servo mounts using the 2.9mm Ø x13mm sheet metal screws provided in the kit, **not** the standard screws normally supplied with servos by the servo manufacturer! This is because all **the holes in our milled servo mounts are 2mm diameter**, due to our CNC manufacturing process, and **this is too big for the normal screws**.

### Take Care:

Composite sandwich parts are extremely strong, but fragile at the same time. Always keep in mind that these airplanes are designed for minimum weight and maximum strength in flight. Please take care of it, especially when it is being transported, to make sure that none of the critical parts and linkages are damaged. Always handle your airplane with great care, especially on the ground and during transport, so you will have many hours of pleasure with it.

### Accessories

Below are the things you may need to get your CARF SIAI Marchetti SF-260 into the air. Some of them are mandatory, some of them can be chosen by you. What we list here are highly recommended parts, and have been thoroughly tested.

- 1. High torque standard size digital servos** (min. 9 req'd). for all flight control surfaces. Please do not use inferior quality servos, or servo arms, in this plane. It will result in an aircraft that does not fly accurately, reliably or safely.
- 2. Servo output arms** (9 pieces total). We recommend that you use full metal servo output arms on ailerons, elevator and rudder servos (5 pieces req'd)
- 3. Nosegear steering servo.** Any standard sized servo with at least 10kg torque, and preferably with a metal final output gear.

4. **SIAl Marchetti Retracts Set** with wheels (Item Number 100500)

5. **SIAl Marchetti Pneumatic Pack** (Item Number 100600)

6. **SIAl Marchetti Wheel Brake Upgrade Set** (Item Number 100550)

7. **Engine:** These instructions show the installation of the Moki 100BVT (4-stroke) and the carbon engine mount is originally designed for this engine. If you use the DA-100, you have to install the plywood spar which is including in the kit. Engines can be purchased from CARF. Moki 100 BVT (Item Number 953100), DA-100L (Item Number 950100)

8. **Fuel Tank** (min. 1.0L)

9. **Propeller and Spinner** (Item Number: 810101): We recommend a 24 x12" or 26 x 10 2-blade carbon prop for the Moki-100VT and for the DA-100 a 2-blade carbon prop from 26 x 12 up to 27 x 12.

10. **Use only high quality heavy-duty servo extension cables**, with gold connectors. High quality receiver and ignition switches, etc.

11. **Batteries:** We are using 2 x PowerBox 2800mAh LiPo packs for the receiver, connected to the PowerBox Competition power supply, to increase the liability of the electronic components (available from CARF). Additional 1 x PowerBox 2800mAh LiPo pack for ignition.

## **Tools**

This is a relatively easy plane to assemble, not requiring difficult techniques or special equipment, but even the building of CARF aircraft requires some suitable tools! You will probably have all these tools in your workshop anyway, but if not, they should be available in all good hobby shops, or hardware stores like "Home Depot" or similar.

1. Sharp knife (X-Acto or similar)
2. Allen key set (**metric**) 2.5mm, 3mm, 4mm & 5mm.
3. Sharp scissors
4. Pliers (various types)
5. Wrenches (**metric**)
6. Slotted and Phillips screwdrivers (various sizes)
7. M3 tapping tool (**metric**)
8. Drills of various sizes
9. Small spirit level, or incidence meter.
10. Dremel tool (or Proxxon, or similar) with cutting discs, sanding tools and mills.
11. Sandpaper (various grits), or Permagrit sanding tools (high quality).
12. Carpet, bubble wrap or soft cloth to cover your work bench (most important !)
13. Car wax polish (clear)
14. Paper masking tape
15. Denaturised alcohol, or similar (for cleaning joints before gluing)

## **Adhesives and Solvents**

Not all types of glues are suited to working with composite parts. Here is a selection of what we normally use, and what we can truly recommend. Please don't use inferior quality glues - you will end up with an inferior quality plane, that is not so strong or safe.

High performance models require good gluing techniques. We highly recommend that you use either a slow (minimum 30 minute cure) epoxy resin and milled fibre mixture, or a slow filled thixotropic epoxy for gluing highly stressed joints.

1. CA glue 'Thin' and 'Thick' types. We recommend ZAP, as this is very high quality.
2. ZAP-O or Plasti-ZAP, odourless, or ZAP canopy glue 560 (for clear canopy)
3. 30 minute epoxy (we use ZAP for many of the important joints in this aircraft).
4. Loctite Hysol 9462 or equivalent (optional, but highly recommended)
5. Epoxy laminating resin (12 - 24 hr cure) with hardener.
6. Milled glass fibre, for adding to slow epoxy for stronger joints.
7. Micro-balloons, for adding to slow epoxy for lightweight filling.
8. Thread-locking compound (Loctite 243, ZAP Z-42, or equivalent)

We take great care during production at the factory to ensure that all joints are properly glued, but of course it is wise to check these yourself and re-glue any that might just have been missed. When sanding areas on the inside of the composite sandwich parts to prepare the surface for gluing something onto it, do NOT sand through the layer of lightweight glasscloth on the inside foam sandwich. It is only necessary to rough up the surface, with 80/120 grit, and wipe off any dust with acetone or de-natured alcohol (or similar) before gluing to make a perfect joint. Of course, you should always prepare both parts to be joined before gluing for the highest quality joints. **Don't use Acetone for cleaning external, painted surfaces** as you will damage the paint.

**Tip:** For cleaning small (uncured) glue spots or marks off the painted surfaces you can use old-fashioned liquid cigarette-lighter fuel, like 'Ronsonol' or equivalent. This does not damage the paint, as Acetone and many other solvents will, and this is what we use at the factory.

At **CARF** we try our best to offer you a high quality kit, with outstanding value-for-money, and as complete as possible. However, if you feel that some additional or different hardware should be included, please feel free to let us know.  
Contact us: [info@carf-models.com](mailto:info@carf-models.com)  
We know that even good things can be made better !

**Did you read the warnings above and the complete instructions carefully?  
Did you understand everything in this manual completely?  
Then, and only then, let's start assembling your CARF SIAI Marchetti SF-260!**

## **Building Instructions**

### **General Tips:**

We recommend that you follow the order of construction shown in this manual.

The first thing to do is protect the finished paint on the outside of the model from scratches and dents during building - so cover your work table with a piece of soft carpet, cloth or bubble-plastic.

The best way to stop small spots of glue getting stuck to the outside of the fuselage is to give the whole model 2 good coats of clear car wax first, *but* of course you must be sure to remove this 100% completely before adding any decals or markings. Additionally you can cover the majority of the fuselage with the bubble-plastic used to pack your model for shipping, fixed with paper masking tape, which also protects it very well.

When sanding any areas of the inside of the fuselage to prepare the surface for gluing something onto it, do NOT sand right through the layer of glasscloth on the inside foam sandwich !

It is only necessary to rough up the surface, with 60/80 grit or equivalent, and wipe off any dust with alcohol (or similar) before gluing to make a perfect joint.

Before starting construction it is a good idea to check inside the fuselage for any loose glass fibres that could cut your hands. A quick scuff over any of these with a coarse Scotchbrite pad will remove them.

**Note:** It is very important to prepare the inside of the fuselage properly, by roughing up and cleaning the surface, before gluing *any* parts to it!

## Are you ready? Then let's start to built your SIAI Marchetti SF-260!

The following steps will describe, where necessary, primarily cutout and installation procedures. Please refer to the Parts List for the correct sizes of the required screws, bolts, ball-links, threaded rods, and tubing (included with kit).

# 1. WING

## 1.1 Main Landing Gear and Gear Door installation

### Tip:

Before installing the gear, the wing **MUST** be mounted to the fuselage. This assures that the wheels will fit perfectly within the wheel-wells in the fuselage during the retract/extension cycle. At this stage, the fuselage has nothing inside, other than the factory installed formers, so that it can be turned on its back to make mounting the wing easier.

For those with less room in the workshop, the steps for the wing/gear installation can be done one side at a time. Servo and (optional) lighting installation can be carried out with the wing panels detached.

We recommend beginning by gluing the reinforcement strips for the gear-door mounting points. This **CAN** be done after the landing gear is installed, but...



Rough up the inner gluing surface, cut a 3mm strip to size (90 x 15 mm) and glue into position with thickened 30 minute epoxy. Use clamps to secure till cured.

Before installing the CARF landing gear, make sure that **ALL** parts are mounted (gear main body, leg, wheel and - if used - brake system).

The first step is to set the gear leg connecting pins into the pivot blocks, locking each in place with the supplied set-screws. To each set screw, apply a drop of LOCTITE 243 (or other medium strength threadlocker).



Before installing the set screws, we recommend filing/grinding a small flat at each point where they contact the steel axles, to prevent twisting in use. The gear leg itself is secured with four (4) screws, making this step uncritical.

Before mounting the gear leg to the retract body, a 2.5mm hole must be drilled in the forward facing face and threaded with a M3 tap following the accompanying diagram (distance from the hole center to leg base = 31mm). This serves as the mounting point (with ball-link) for the gear door arm.



**Detailed assembly information for the landing gear and (optional) brakes can be found in the accompanying instruction sheet from the gear manufacturer.**

Once all the gear parts are together, installation of the unit into the wing panel can begin. Secure the fuselage on its back, with padding to prevent shifting, tipping and dings, and slip the wing tube in place. Secure a wing panel (both,

if you have room) to the fuselage with the supplied mounting screw.



### **IMPORTANT!**

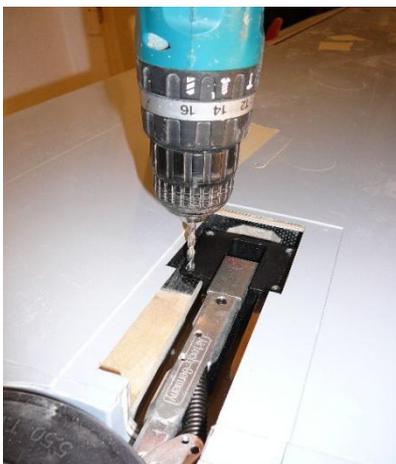
**These two bolts (with washers) must be installed and tightened before flying. They keep the wing panels in place – rather important for the extended life of the model!**



The gear assembly can now be slipped into place from the wheel well at a slight angle.

We suggest using the pictured method to center the wheel/gear assembly. Care must be taken to assure that the gear leg is parallel to the mounting plate (viewed from above).

With the gear is aligned, a tiny drop of CA adhesive can be applied to the black mounting brackets to temporarily hold things in place. Use a bit of accelerator to keep the glue from wicking too far under the aluminium brackets. After drilling the mounting holes, the gear can then be popped loose.



Care must be taken to drill the holes at right angles to the mounting plate. Clearance notches, if needed, can be made in the wing skins to allow the screw to be properly inserted/tightened.

**IMPORTANT!** Drill the holes perpendicular to the mounting plate – NOT the wing surface – as the plate is at a slight angle!



The socket-head screws and blind nuts for installing the gear are included in the accessory pack.



To install the blind nuts, please proceed with the following sequence.

Insert a screw, with two or more washers into the hole. Locate a blind nut under the screw (a set of curved tweezers or forceps is helpful here). Using a proper tool, screw the bolt up tight, drawing the blind nut up into the plate till fully seated (the washers help distribute the force equally, preventing damage). Secure the blind nut with a bit of Epoxy, being careful not to get any into the threaded area. Same procedure for the rest of the gear mounting bolts.



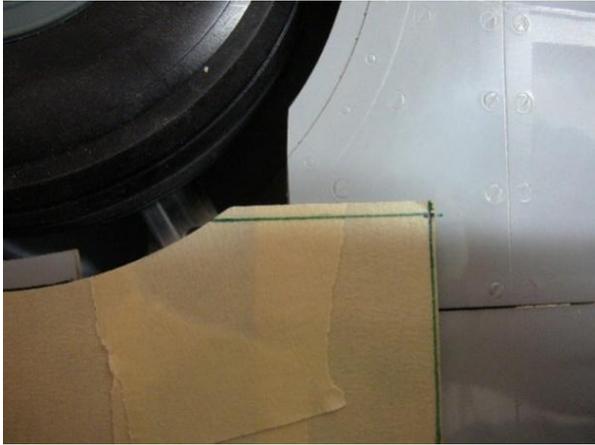
Once the Epoxy has cured, the bolts can be removed, the gear is set in place and secured.



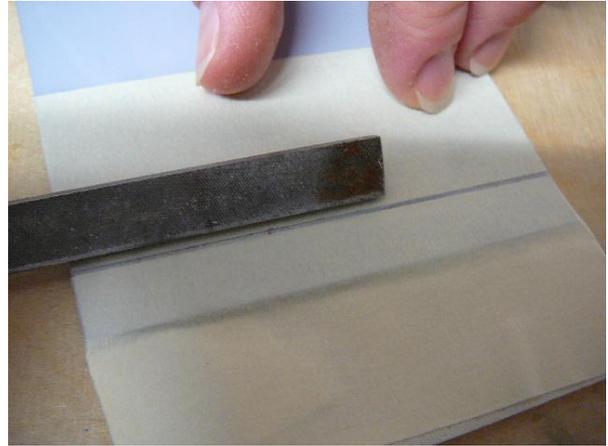
The landing gear covers can now be prepared for mounting.

The covers need to be lightly sanded to final shape so that they fit cleanly, but not tightly, in the corresponding recesses in the wing surface.

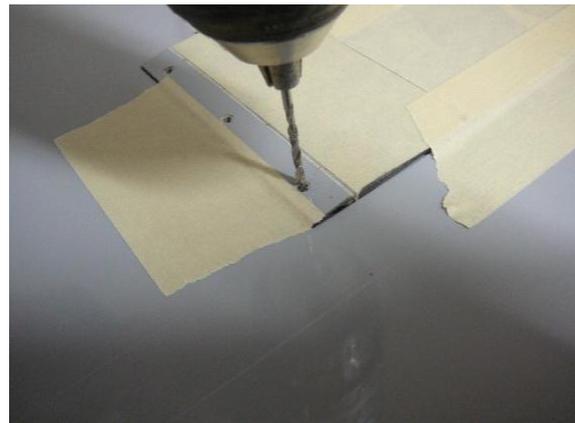
(see also next picture)



The fiberglass part has a factory built-in seam with integrated fabric hinge. In order that the hinge opens wide enough, lightly file the edges of the hinge-line at a shallow angle (see photo), taking care not to damage the hinge material.



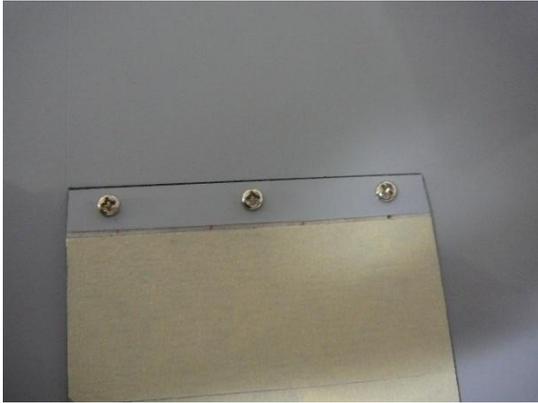
Use masking tape to protect the gelcoated/painted surfaces.



The cover is laid in the recess, and secured with tape. Drill 2mm holes thru the cover and the plywood strips glued in from a previous step.

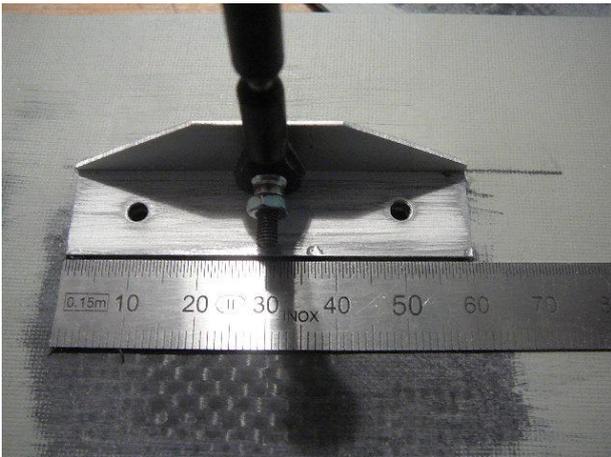


Then, remove the cover and open out the hole to 3mm (ONLY in the cover).



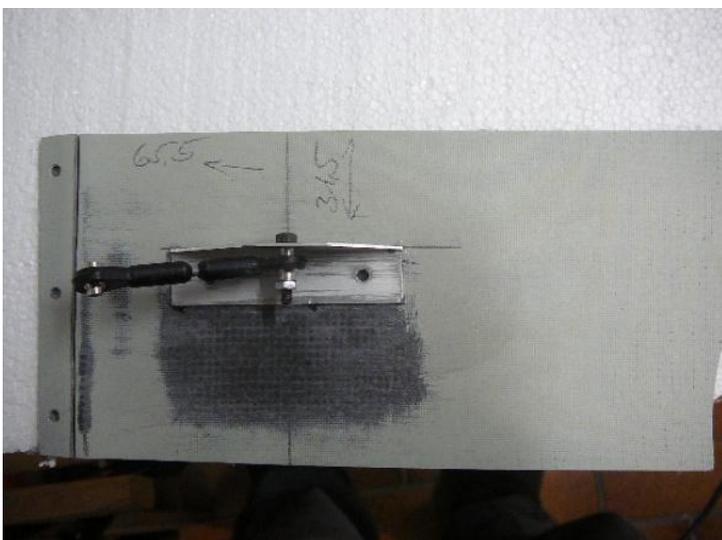
The cover is then fixed to the wing with three 2.9 x 13mm wood screws. If preferred, blind nuts with corresponding machine screws may be substituted.

With the completion of the landing gear/sear cover installation, the wing pnel can be separated from the fuselage. All other build/installation steps can be carried out on the individual panels. Please cover/pad your work surface to protect the painted surfaces of your SIAI Marchetti.



In order for the gear covers to function properly, they must be fitted with a hard-point for the actuating rod. We have used a 15 x 60mm aluminium angle – the 10mm side trimmed at an angle (see photo) – and a centered hole drilled for a ball-link. Two small (2mm) holes are drilled in the wide part of the angle as shown for final attachment to the cover.

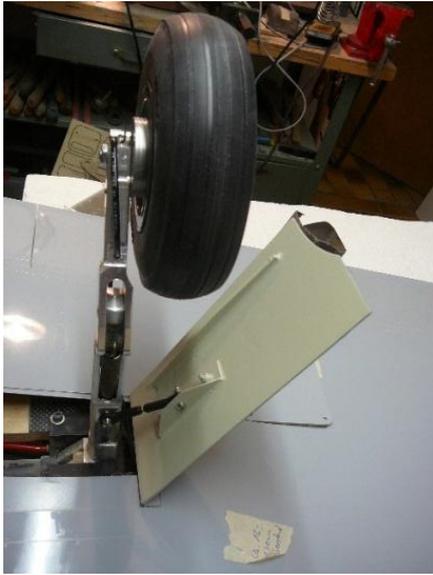
The center-point of the ball-link hole is approx. 65.5mm from the outer edge of the cover (left edge in photo) towards the wheel, and the upwards extending face of the alu-angle is approx. 31.5mm from the front edge of the gear cover. Fix temporarily in place with magnets or a drop of CA and drill the two 2mm holes thru the gear cover, fixing with 2mm machine screws and nuts.



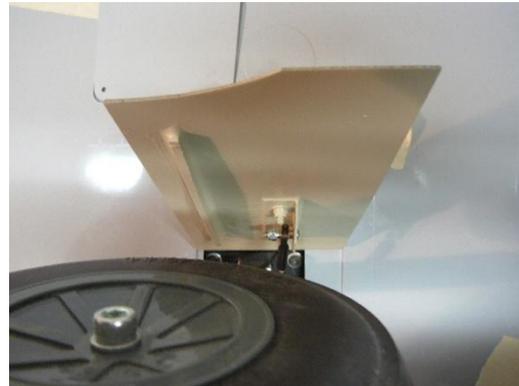
Prior to the final assembly, the inner surfaces of the parts can be painted.

The following pictures illustrate the completely installed landing gear and gear covers. A 3mm ball-link setup is used.

The following pictures illustrate the completely installed landing gear and gear covers. A 3mm ball-link setup is used.



To prevent the main gear cover from fluttering and to assure a more positive sit within the recess, we added a lengthwise reinforcing strip. The final positioning is by trial and error to ensure that it does not interfere with the closing of the cover. It must not contact any part of the gear unit or airframe.



## 1.2. Installation of the aileron and flap servos

### 1.2.1 Aileron servo installation

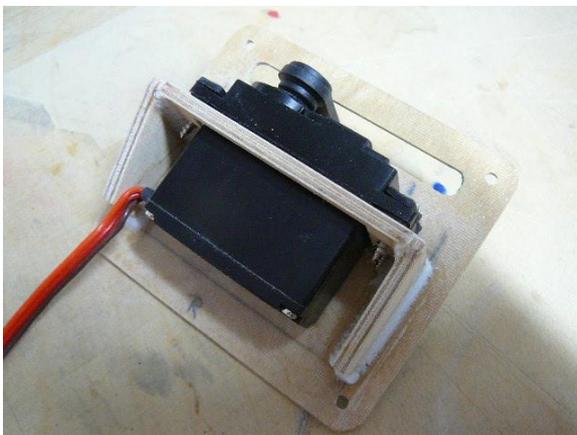


The aileron hatch covers and wood reinforced openings are pretty much ready for servo installation.



The servo is installed directly to the hatch cover with a plywood frame (frame glued to cover with 30 minute Epoxy) from parts included (see photo).

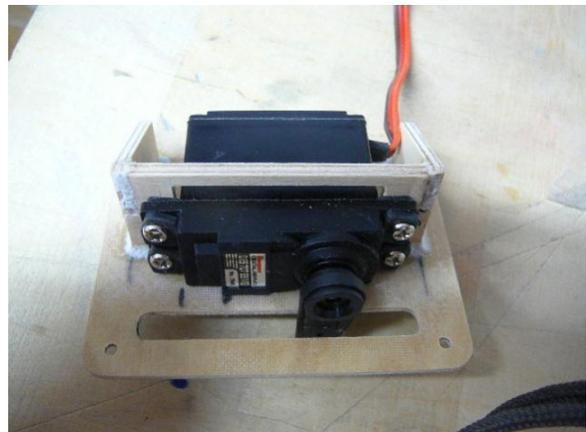
**Important:** Rough up the gluing area with sandpaper and clean!



Before gluing, the exact position of the mounted servo must be determined and marked.

When the Epoxy has cured, the servo can be screwed into the frame. Install with the servo output shaft toward the wing leading edge.

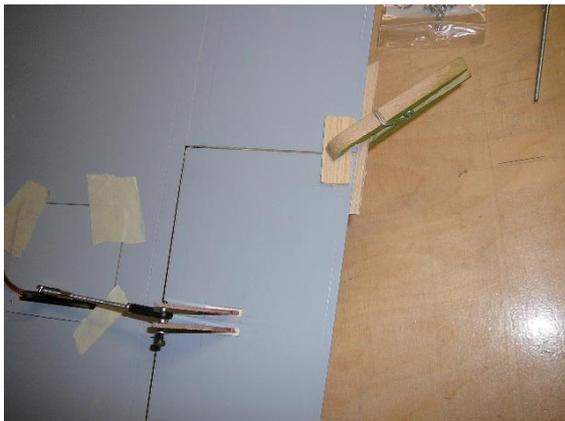
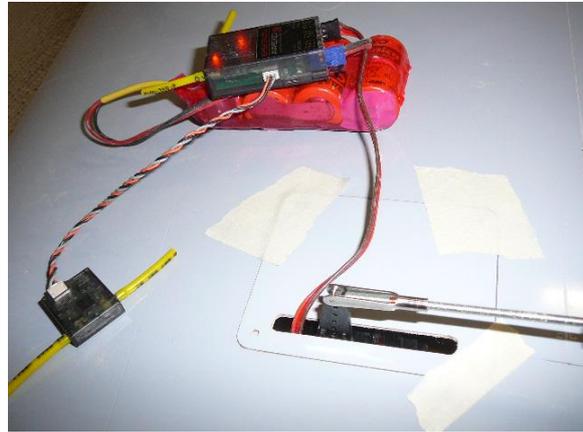
The output arms normally supplied with servos are, for a model of this size, generally inadequate! Better arms from aluminium or carbon- reinforced nylon are available for nearly all servo makes.





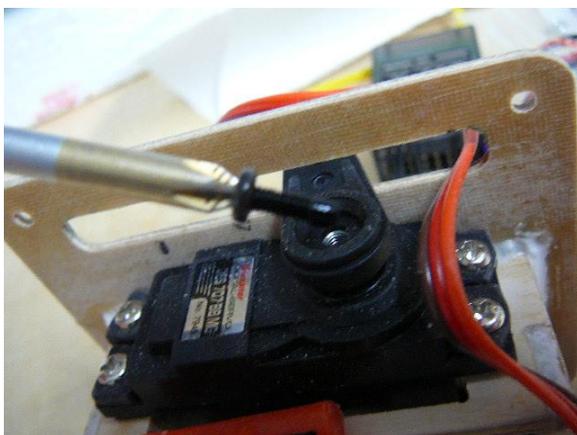
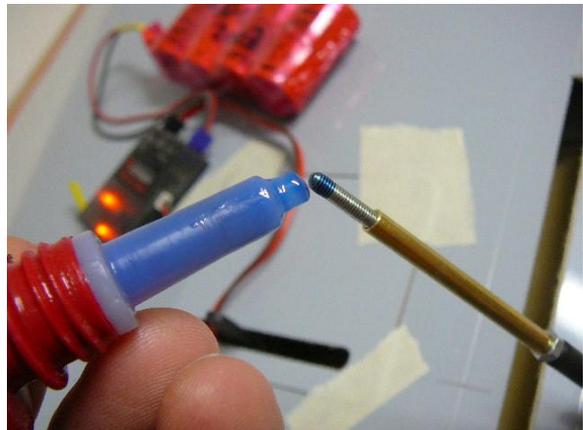
The servo opening must be opened up in order that the servo fits cleanly. Leave enough material in the corners to take the attachment screws.

All parts needed for control surface hook-up is included in the accessory pack. For determining pushrod lengths and centering the servo arms, it is suggested to use the radio with receiver/battery, or an electronic servo centering device (available at most hobby shops/internet).



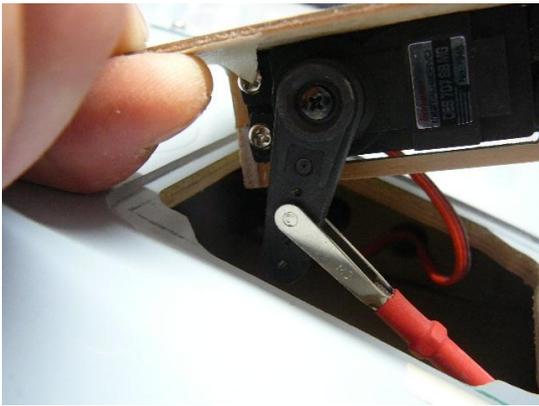
For the initial setup, the ailerons are secured, centered as shown.

Once pushrod lengths are determined, secure all threaded connections with Locktite or a stop-nut.



The servo arm screw should also be secured with a tiny bit of thread locker (non-permanent).

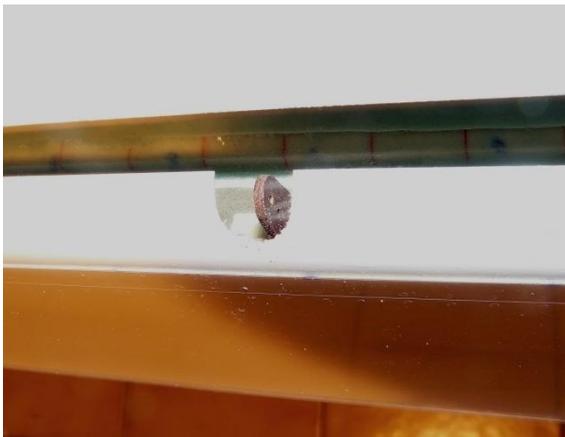
### 1.2.2. Flap servo installation



Installation of the flap servos follows the same procedures as the aileron servos, including orientation.

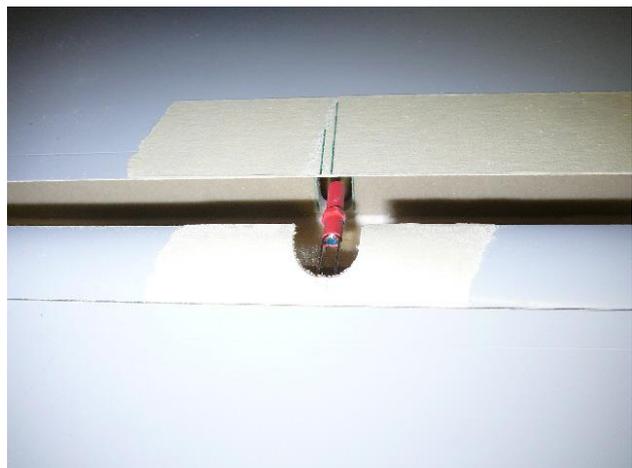


The only difference being that the linkage passes within the wing panel, the servo arm oriented to the inside.



The flap horn is factory pre-installed.

The linkage runs direct from the servo to the flap horn. A passageway must be ground in the visible part of the rear spar where the linkage is to emerge.



#### **Attention!**

Make sure that the clevis/linkage does not rub or catch on any part of the airframe!

With the previous steps completed, and before the mounted servos on their hatches are finally screwed in place, all extension leads to the servos (and optional lighting) must be fed from the root rib to their corresponding end locations..

### 1.2.3. Wing Wiring

Openings must be ground in the panel root ribs, using the approx. measurements provided, for the wiring and pneumatic lines. The corresponding openings in the fuselage may be cut smaller. The larger opening in the wing rib allows easier routing of the wires/tubes. A factory formed opening is provided in the main spar, to allow the passage of the servo/lighting wires and pneumatic tubes from the front part of the wing to the rear, in the vicinity of the flap servo bay. This makes routing the wiring out to the wingtips easy.

The pneumatic tubes can also be routed thru this opening to the gear units.

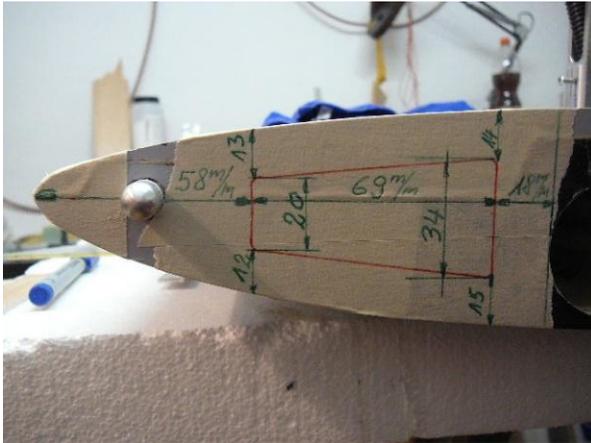


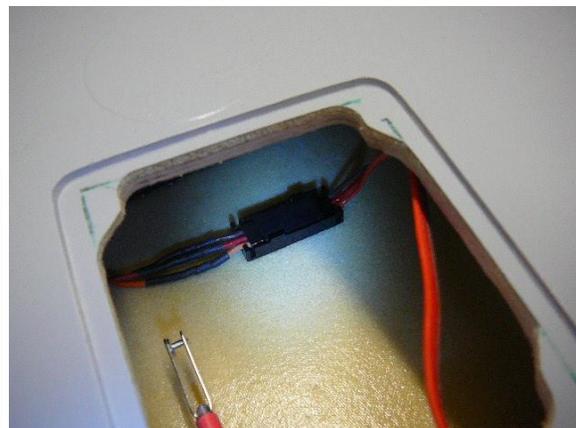
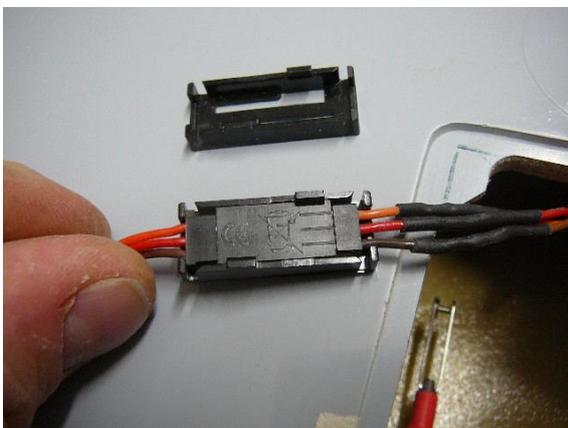
Photo: Wing is lying upside down!



Photo: Wing connections (electric and pneumatic)

A wood support rib/former is located under the fiberglass skin at the root with an opening approximately the size of the given measurements. The marked area can be cut a bit smaller, then sanded to match the cutout in the wood. This is preferred, as there is then no damage to the wood part.

To prevent the wires and tubing from flopping around inside the wing panel and possibly becoming disconnected, servo-plug security and retract tubing clips (commercial items) or even tape is to be used. This applies also to all other connections.



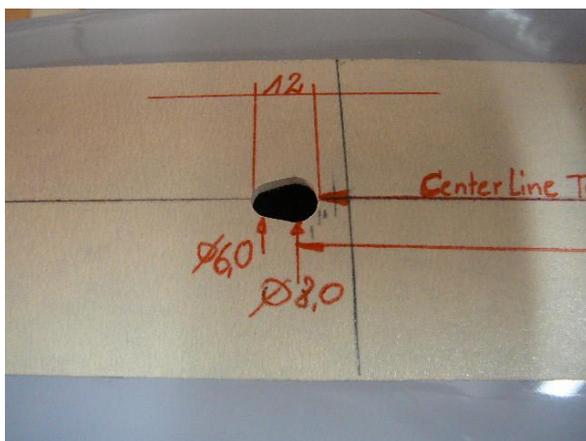
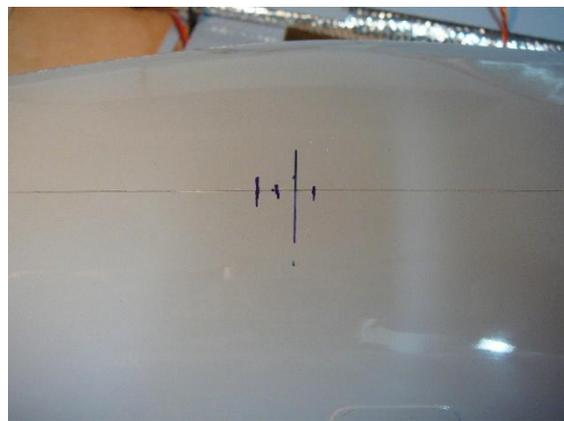
### 1.2.4. Tip Tanks



The wingtip tanks are factory ready for final installation with a single 3mm (M3) screw. The aluminum mounting tube is pre-threaded.

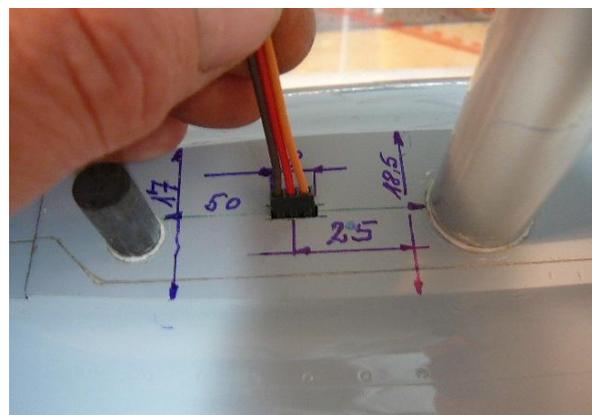
For those wishing a scale lighting system, the conversion is fairly easy. As there are numerous lighting systems on the market, we will illustrate, as an example, a position-light installation in a customer aircraft.

First, the centerline is determined/marked, then the point at the greatest diameter (see photos).



A clearance hole is drilled for the heat sink and wiring, based on the size of the lighting unit.

In the next step, a connector is fitted in the wiring between the wing and tank.



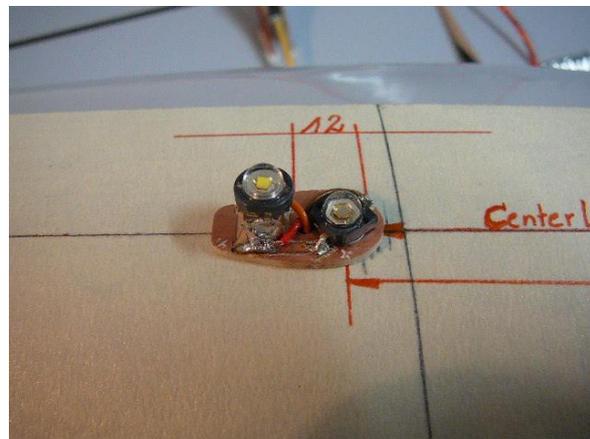


The shape of the position light cover dictates the shape of the baseplate that the lamps are attached to (some covers are simple teardrop shaped).

Show is a version for position light and strobe.



The baseplate is then glued to the tank using CA or Epoxy.

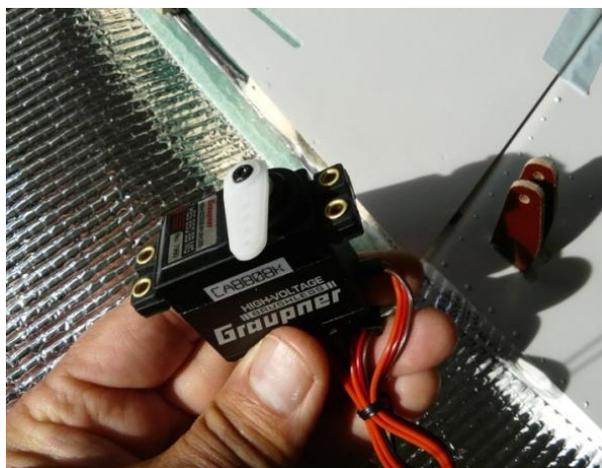


To conclude the position light installation, the cover is secured in place with canopy glue.

## 2. Horizontal Stabilizer

The horizontal stabilizer comes in a near-finished state, requiring only fitting and securing of the aluminium hinge-pin, and mounting the elevator servo.

### 2.1. Servo Installation – Horizontal Stabilizer

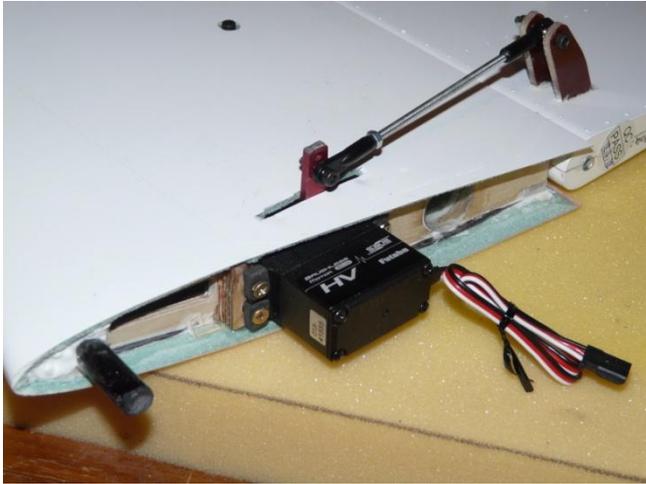


#### Attention:

The brass eyelets must be inserted in the servo grommets with the wide base toward the servo mount. This is to prevent the eyelet from digging into the wood when the servo is tightened down.

The servo is mounted into the root of the horizontal stab – essentially upside-down. This means that the brass eyelets must be inserted with the wide base toward the top of the servo.

As shown here, an approx. 6mm thick plywood spacer is set on the front side of the mounting tabs (use here 2,9 x 25mm screws) so that the servo arm is centered in the slot of the stabilizer and does not rub.



**Be sure to use servo arms that are properly dimensioned for the task (length and strength)!**

The required linkages (ball-link, fork clevis and rods) are included with the kit, and the setup is analogous to the the aileron installation.

## 2.2. Hinging the Elevator

The hinging of the elevator(s) has been almost completely pre-fabricated.

Only the 4mm Aluminum hinge-pin needs to be flared on the end facing the fuselage to prevent it from slipping inside the elevator.



After trimming the hinge-pin to length (from the end opposite the flared end), it can be inserted and secured with a bit of tape over the flared end.

The servos are connected before flying, during the field assembly, with the servo wire extensions in the fuselage.

## 3. Fuselage

### 3.1. Vertical Stabilizer/rudder and Rear Fuselage

#### 3.1.1. Rudder Servo and Linkage



A hatch for the rudder servo is worked into bottom of the fuselage rear, with cover. This cover will be secured later with a screw in each corner.



The rudder servo is installed into the pre-fabricated servo mount within the fin. The slots for the servo arm must be determined and cut. This is easily accomplished with the aid of a small, bright light (LED flashlight works well). The silhouette cast (visible on the outer skin) gives a good indication of the servo arm and rotation axis. A slot is then cut large enough to assure unrestricted movement of the arm and linkage.



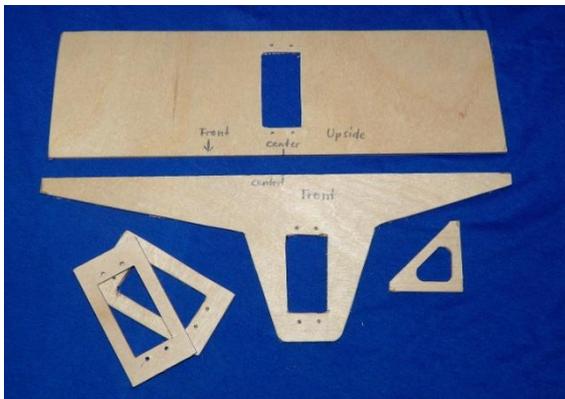
View of the rudder linkage (fuselage is on its back).

The clear plastic fairing is not included with the kit, and must be painted before mounting.

### Alternate Rudder Servo Installation



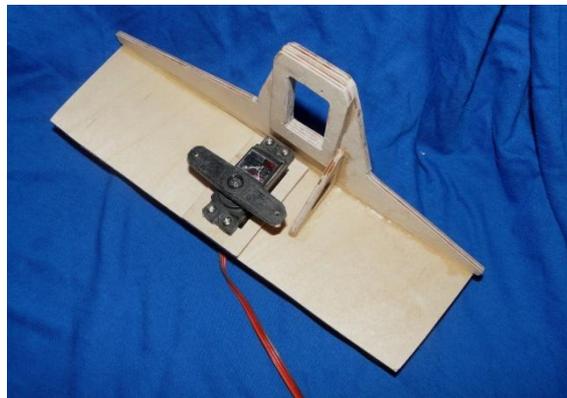
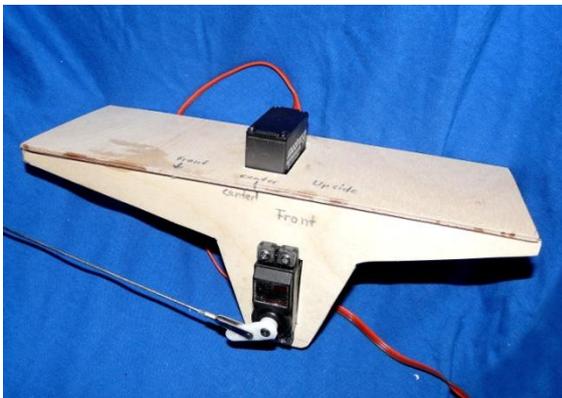
Future kits will provide an alternate method for mounting the rudder servo, together with an optional servo location for an air-tow release, installed directly behind the cockpit opening.

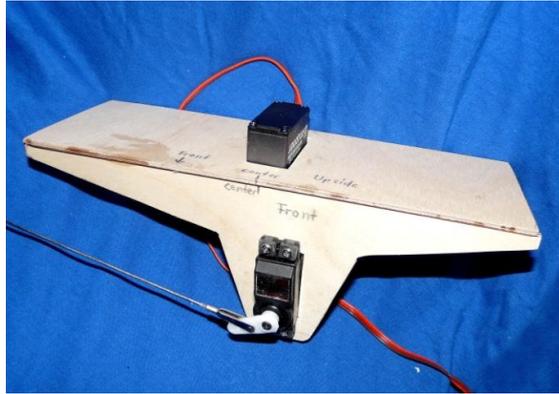
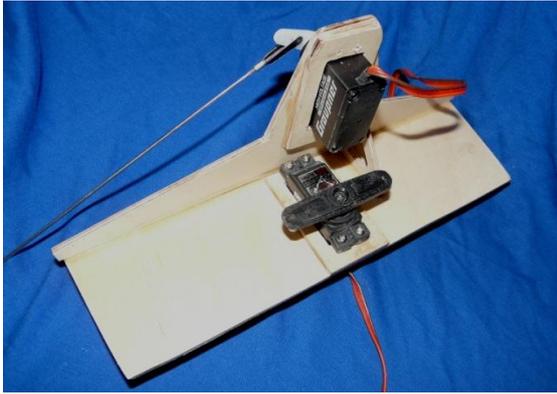


The necessary parts will be included with the newer kits.

The parts consist of:

- Horizontal mounting plate (3.3mm plywood) for the rudder servo
- Vertical mounting plate (3.3mm plywood) for the tow release servo
- 1 x reinforcement gusset (plywood)
- 2 x servo mount doublers (plywood)
- Fiberglass matt for fuselage/servo-board reinforcement





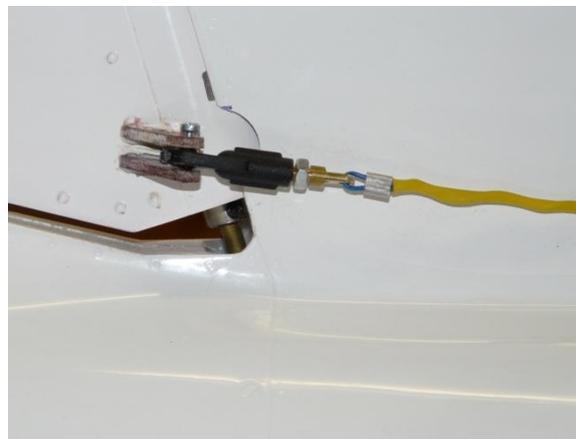
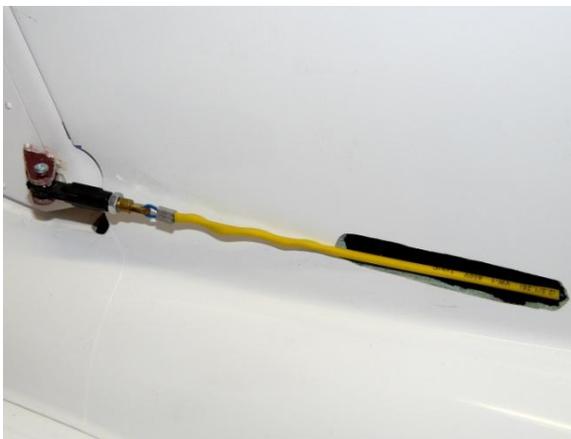
The servos can be mounted once the glue has dried/cured. The rudder servo is installed first, with the output arm oriented toward the fuselage bottom and fixed in place, as one of the mounting screws will be partially blocked by the (optional) tow release servo. Install the tow release servo only AFTER this step, if applicable.

The complete unit is then guided into the upper rear fuselage from the cockpit opening, with the vertical servo board facing the front, to

determine the best location for gluing. The distance is approx. 80mm from the canopy opening. Use care to keep the horizontal servo board level.

Once the ideal position has been determined, tack-glue the unit in place (CA) prior to permanently fixing with thickened Epoxy (cotton or kevlar pulp, milled fiberglass) followed by a strip of fiberglass cloth (about 2cm wide) on both sides of the joint (top and bottom). Smooth out the thickened Epoxy before it hardens.

The rudder/servo linkage is the "closed loop" type using two braided steel cables. Two openings (left and right) must be plotted in the fuselage for the projected cable run, about 5cm forward of the rudder control-horns. Test fit the cables and rework the openings – if needed – so that the cables do not rub.



**Note!**

If the aero-tow option is chosen, use a servo with at least 10 Kg or 130 in/oz of torque!

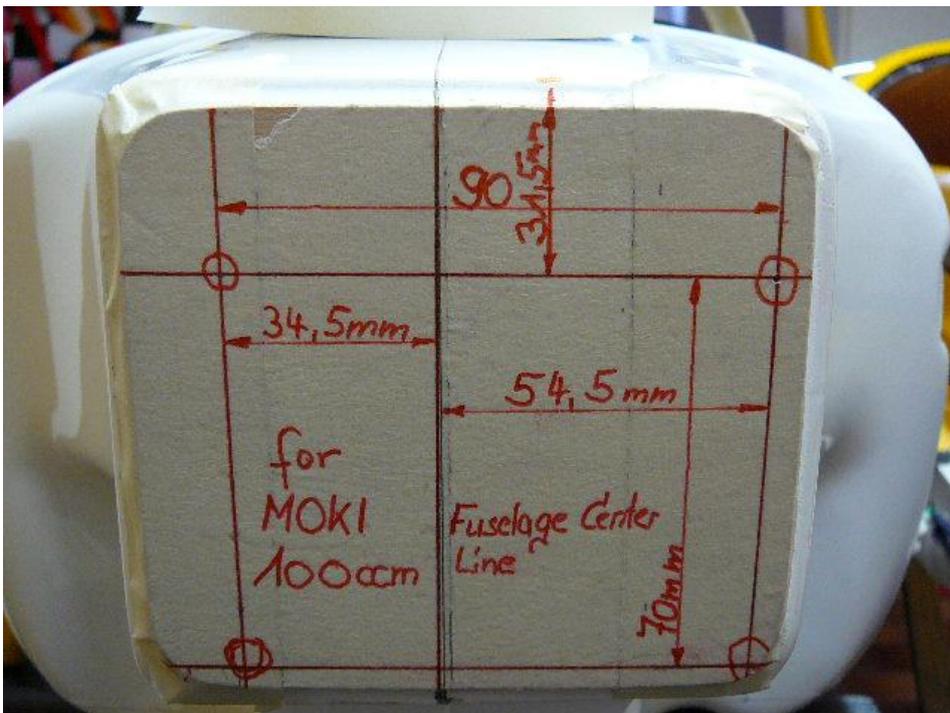
To ease locating the proper placement of the complete unit, a 2mm hole is bored vertically thru the fuselage top, about 70mm to the rear of the canopy opening for the tow-line release pin. Connect the pin with the servo arm and feed the pin thru the hole. The complete unit is then positioned in the fuselage, the final spot being set by the vertical positioning of the tow release pin. Unfortunately, the various case heights of the many servos on the market prevent us from providing an exact measurement.

### 3.2. Motor-Montage

The SIAI-Marchetti is an ideal airframe for the use of a "Boxer" type motor, with the 100ccm Moki 4-stroke, DA-100/120 or other similar motors (3W-110iB2) as examples. For mounting the generally shorter, two stroke motors, CARF includes a precut plywood plate for extending the motor dome. For the longer Moki 4-stroke, this part is not necessary.

#### 3.2.1. Motor Installation

The Moki 4-stroke may not be the most powerfull powerplant in the line-up, but the simplicity of installation – and the SOUND – make it an ideal choice. In contrast to a 2-stroke motor, the mufflers can be attached directly to the motor dome, eliminating special internal cutouts/fittings.



**Take the measurements for the mounting holes from the photo.**

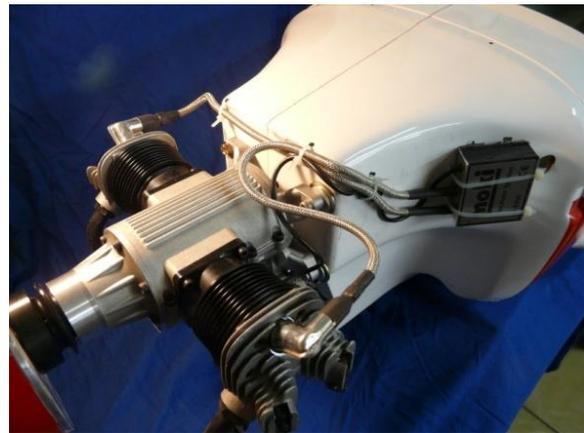
It is a good idea to combine the drilling of the motor bulkhead and the nose gear mount in one operation.



The opening beneath the motor bulkhead is for the carburetor air intake (from fuselage).

The down thrust, built in at the factory, needs no adjustment. For the correct right-thrust, a spacer of about 2.5mm (washers or aluminum strip) needs to be placed between the motor mount and the bulkhead (left side, top and bottom, looking from the pilots' seat)! The length of the motor fits perfectly without any other spacers!

The installed motor, with the ignition unit looks like this...



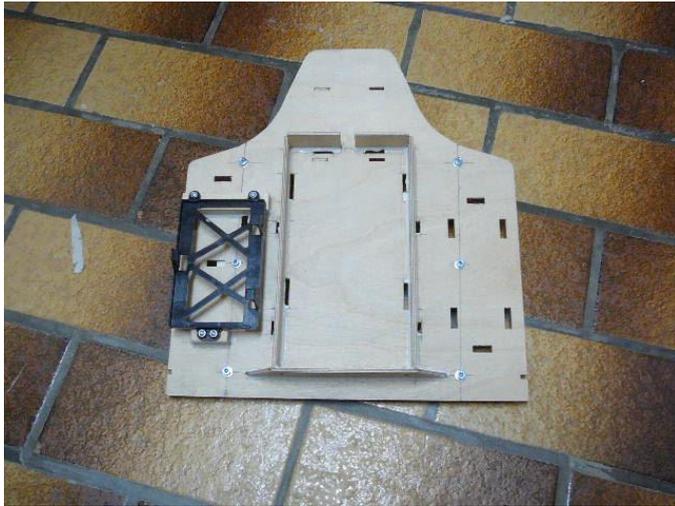
...and here it is with the stock mufflers (model shown on its back) and manifolds with flex extensions. These manifolds can be ordered, fitted for the SF-260.

The blind-nuts should be secured in the bulkhead with thickened Epoxy.

### 3.2.2. Motor Installation: DA-100L or 3W-110iB2 and similar Boxer Motors

For true power flying and towing larger sailplanes, there is only one alternative to the 4-stroke, the gasoline fueled, 2-stroke Boxer! The motors are light, easily maintained, powerful and, once tuned, need little further attention. As an example, we have documented the installation of the 3W-110iB2. **The installation guide is being prepared and will be released shortly as an addendum.**

### 3.2.3. Installing the Plywood Bulkhead in the Fuselage



After mounting the motor, we recommend that the large plywood bulkhead (for securing the tank and other items) be installed in the proper position. Beforehand, the location for the throttle servo and the (optional) choke servo must be marked and cut out.

The frame for the fuel tank (in parts pack) is to be glued to the bulkhead.

The bulkhead is positioned 7.5cm below the “windowsill” of the windshield, oriented level in all axis. In conjunction with fuselage air intake, we recommend fitting a screen filter over the carb intake. A simple solution is to attach the screen directly (flat) over the opening in the



motor dome bulkhead. Ideally, the Moki air filter would be used. Its size, however, presents clearance issues with the nose gear retraction.



The pushrods for the throttle (shown here with the choke set-up) should be installed before installing the nose gear unit, as you have perfect access from the wheel well to the front part of the fuselage and the servos. The photo also shows an intake filter made from a tea strainer that has been trimmed and “hand formed” to size, attached to a carb intake ram tube (optional accessory).



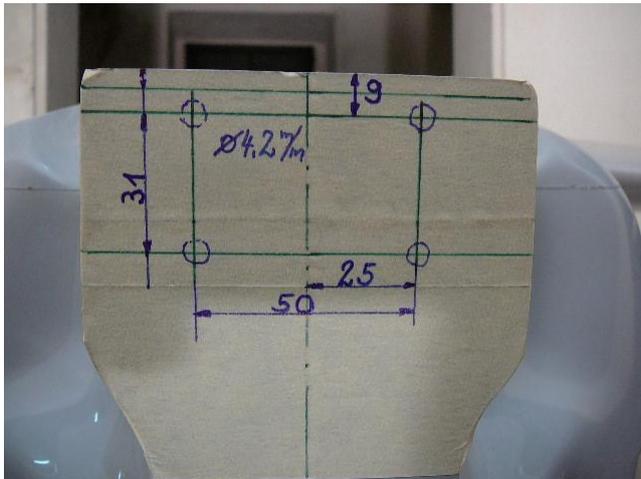
The opening for the fuel tubing can now be drilled in the right side of the motor dome.

We recommend inserting a rubber grommet in the hole to protect the fuel line from chafing.

### 3.3. Nose Gear Installation

**Tip:**

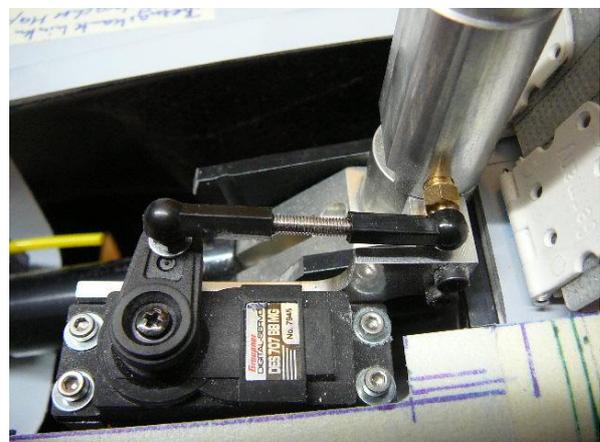
**We recommend drilling the motor mount and retract unit holes in one step!**



The holes for the retract unit are drilled using the illustrated measurements (**in our example, the fuselage is on its back**).

Before any other work is done, the gear leg, wheel and servo must be installed, following the manufacturers instructions, to the retract mechanics.

To prevent the nose gear servo from hitting the cowling when going to the extended position, a cutout must be worked into the cowl as shown.

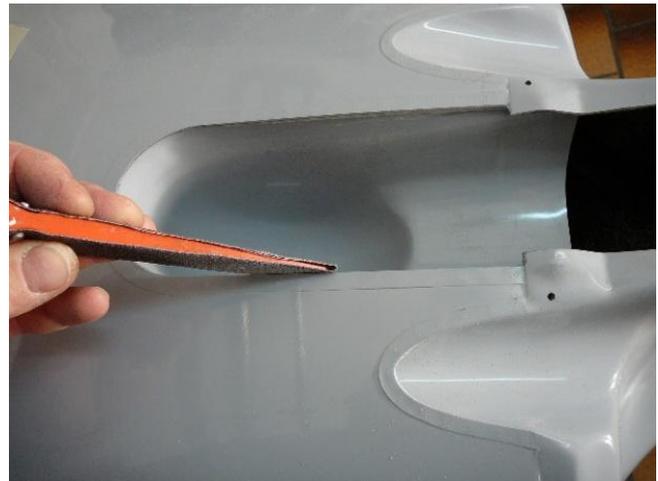




When making the cutout, be sure to take into account the movement of the servo with the gear leg!

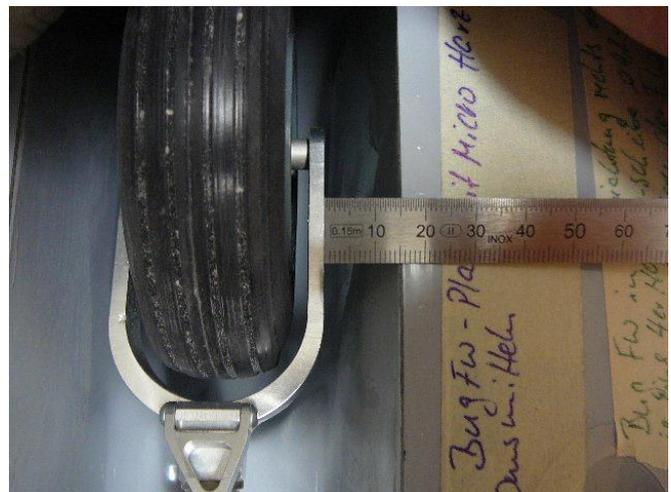
With the first “dress rehearsal”, it may be found that the length of the gear/wheel-well is a bit short. If this is the case, the curved base of the wheel opening can be ground a bit “longer”.

This should be done with a hand file or a rounded sandpaper block (do not use a power grinder). Better to cut away a little at a time as too much at once!



Check that the gear leg has equal spacing from the well walls when in the retracted state.

If needed, a washer (spacer) can be inserted between the gear and the bulkhead.



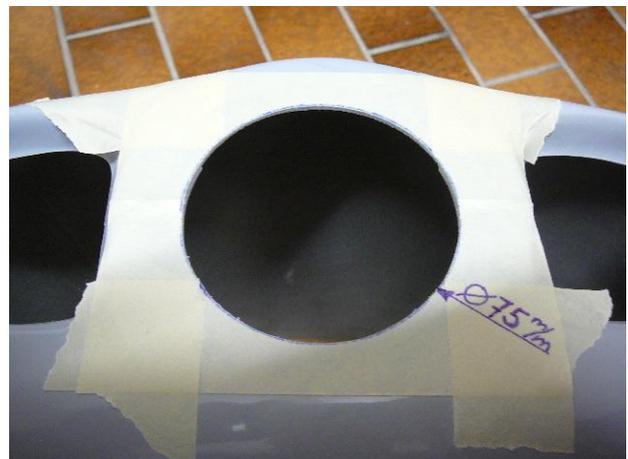
### 3.4. Engine Cowling

The cowling is a two part affair, split horizontally into an upper and lower section. The mounting holes are pre-drilled and require no further work. This type of cowling makes getting at the motor easy without having to remove the prop and spinner. It also makes motor installation and alignment easier.



The horizontal separation line is also on the centerline of the opening for the propeller drive washer/shaft.

First trim out the drive opening just large enough to allow passage of the drive washer. Mark out an approx. 75mm circle, centered around the prop shaft, remove cowl and trim out the the opening to the line. Use masking tape over the area to be trimmed to prevent the painted surface from chipping.



A good way to get a clean opening, is to use a sandpaper roll – somewhat slow, but accurate and easy on the paint. Or, if you've a steady hand, a rotary grinder will make short work of it.

And this is the way it should look!



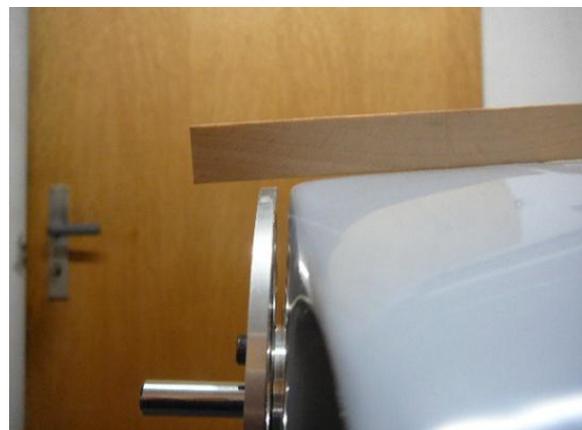
If a landing light is to be used, the corresponding marked area of the cowl must be cut open and cleanly sanded out to size.



The gluing areas of the oil cooler scoop moulding - below the landing light - and the intake lip are lightly scuffed and cleaned prior to gluing. The lip is then glued to the main body of the scoop.

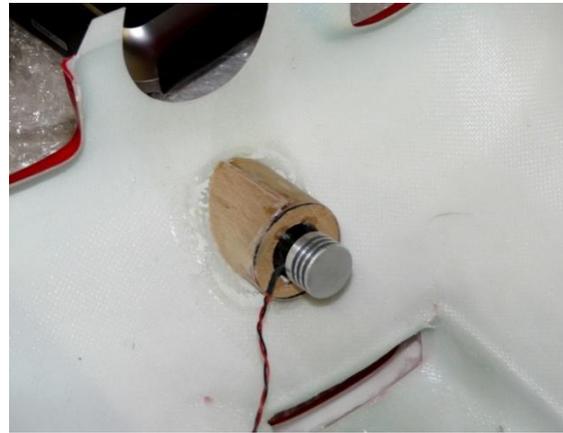


If the motor has been correctly aligned in the cowl, the spinner should line up properly. But, it doesn't hurt to check.



### 3.4.1. Landing Light (not included)

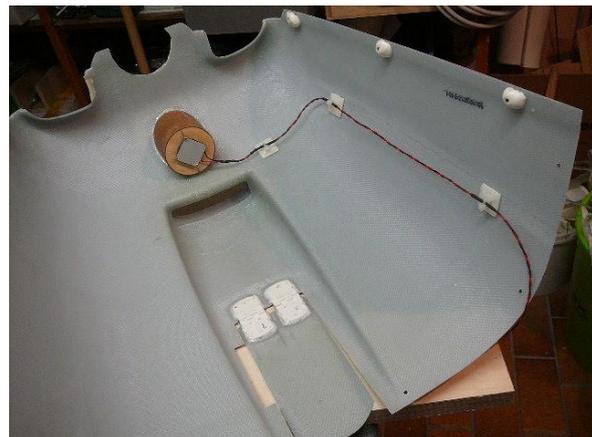
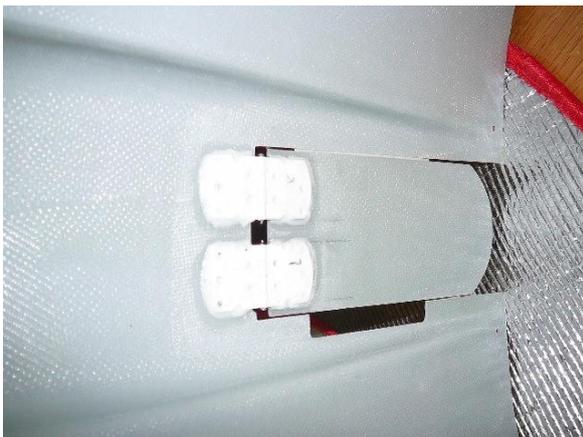
Landing light kits are offered from various manufacturers. We can help you to make the best choice – just ask!



### 3.4.2. Nose Gear Door

First, the lower end of the nose gear door is to be ground/sanded to a semi-circular shape.

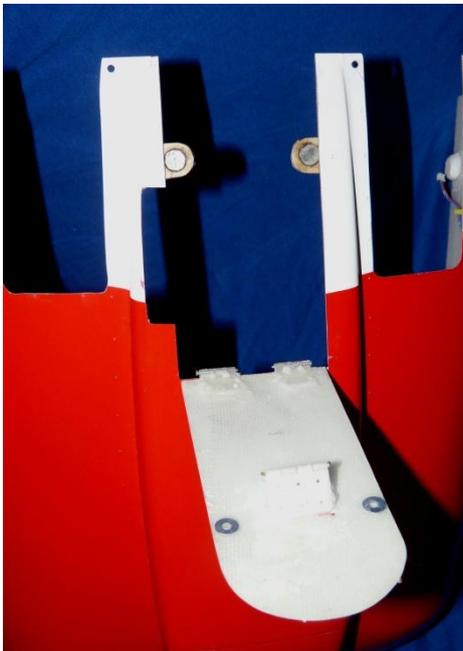
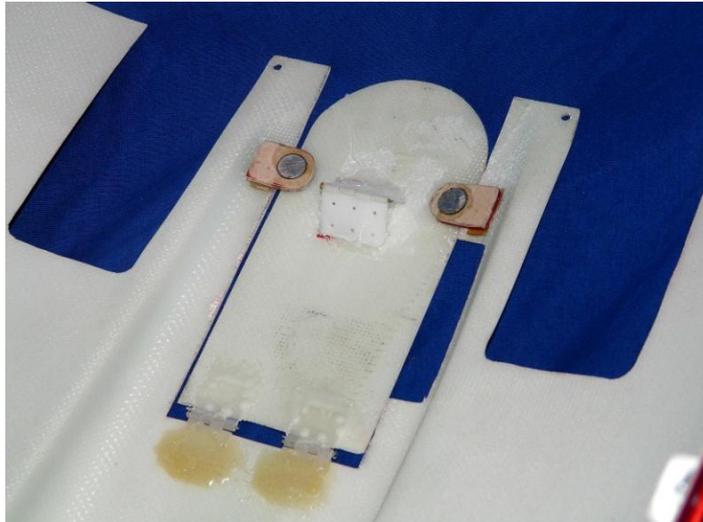
Next, the hinges are glued at right angles to the “top” of the door. When cured, the door with the hinges can be glued into the engine cowl. Use 30 minute Epoxy and scuff/clean the areas to be glued.



When the gear is extended, the door hangs free – it is not attached to the gear leg. With the gear retracted, the airflow closes the door where it is held in place with magnets.



To prevent the door from fouling the scissor-link during gear cycling, a simple spacer can be made with a spare hinge, epoxied in place as shown. This simple fix assures appropriate clearance.



If the model is to be transported with the gear retracted, the free-hanging door can pose a problem. We have found a simple cure, using two thin metal plates (washer) on the door and two 10mm dia. power magnets attached to small wood strips glued in the appropriate place in the gear well. This "fix" also helps to keep the door closed during positive "G" and stalled maneuvers. A very simple, but effective solution.

### 3.5. Canopy and Windshield

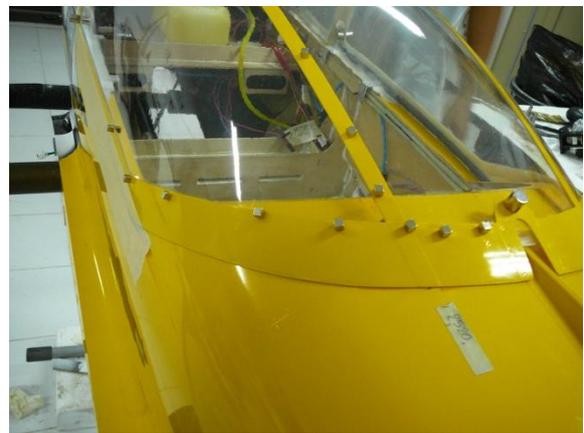
For this part of the build, extra care and cleanliness is called for so that the pristine state of the clear "glass" remains so. We do not recommend using scissors or shears to trim the parts, but to use a small diamond-faced cut-off wheel. Using scissors, especially when the plastic is cold, can cause tears or worse, breakage.

The first step is to rough trim the clear plastic, enough to at least allow the part to fit on the fuselage over the closed canopy frame. Tape the canopy temporarily in place so that the final trimming line can be marked with a felt-tip marker. Enough material must be left to assure a thorough glue joint in a later step. Extreme care must be taken to accurately mark and cut the windshield from the rest of the canopy!

After marking the separation line, the windshield is carefully cut free from the rest and trimmed to fit in the frame. Take your time, trimming a little bit at a time and checking the fit often. When satisfied with the fit, the windshield can be glued in place using silicone, Canopy Glue or other suitable adhesive. Care must be taken so that the canopy bow is not stressed, otherwise the sliding canopy might not close properly!



For holding the “glass” in place during gluing, small spring clamps can be used, or even better, strong magnets. The lower edges of the “glass”, and where the windshield fairs to the front fuselage, magnets are the better choice.



The same goes for the main canopy. In some areas, the use of magnets is the only feasible way (see photos).



Once the cockpit glazing has been cleanly glued in and the glue is dry, it is time to fit the rear canopy braces. The attach points are marked on the canopy bow and the rear base frame. Before gluing, these parts are to be painted to match the documentation, dependant on the variant modeled. In the case of this particular model, gloss black.

The canopy is, as delivered, designed to be easily detachable, but not sliding. There are various ways to achieve this function, that we will not detail here.

### 3.6. Fitting Out the Fuselage

#### 3.6.1. Tank Installation (Fuel and Smoke Oil)



In the standard fuel tank setup, the tank is placed on the mounting platform, within the previously glued-in locating frame, and secured with the supplied hook-and-loop strap. The slots for the strap are pre-cut in the platform.

The correct sized tank can be ordered from CARF as an optional accessory and includes all necessary fittings.

Typical tank fittings orientation shown here:

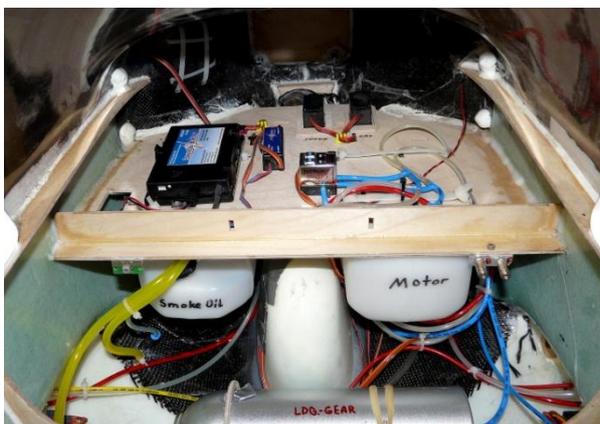
- Center = Fuel feed and clunk
- Top = Vent/overflow
- Lower = Fill/drain



In our example here, FESTO fittings are used in the vent/overflow and fill/drain lines with the appropriate tubing (blue tubing in photo).

The fuel feed line, shown here still with the black rubber tubing, will be changed for the yellow, flexible plastic, tubing.

If using a smoke setup, an identical or smaller (500cc) second tank can be used.



With the Moki motor installation, there is plenty of room for both tanks on the underside of the tank platform separated by the wheel well moulding, as there is no need for muffler tunnels.

The air supply tank for the pneumatic landing gear can be seen installed crossways in front of the fuel and smoke tanks (photo).



For the Moki installation, the oil-feed line is routed above the nose-gear unit, into the engine compartment, and from there to each muffler ("T" or "Y" fitting).



**NOTE! Use only special, heat resistant rubber tubing (generally included with the smoke pump kit) between the "T" fitting and the mufflers!**

Fittings (included with pump kit) must be installed to the front of each muffler to connect the oil feed lines.

### 3.6.2. Pneumatics Installation

As shown in the photo before last, the retract air-supply tank is installed across the width of the fuselage, on the bulkhead that supports the wing tube. To accomplish this, there are two wood parts that support the air tank. To make the tank easy to remove, one of the supports is open. Once the tank is in place, a rubber band or "O"-ring is used to secure it. The air-tank is fitted with a FESTO fitting, making rapid hook-up easy.

Pressurizing the tank is done thru the same connection. The air-line is fitted with a "T" coupler with one side going to the fill valve and the other to the air control valve.

Please refer to the air-control valve manufacturer instruction sheet for the correct air line hook-up.

### 3.6.3 Radio System/Electronics Installation

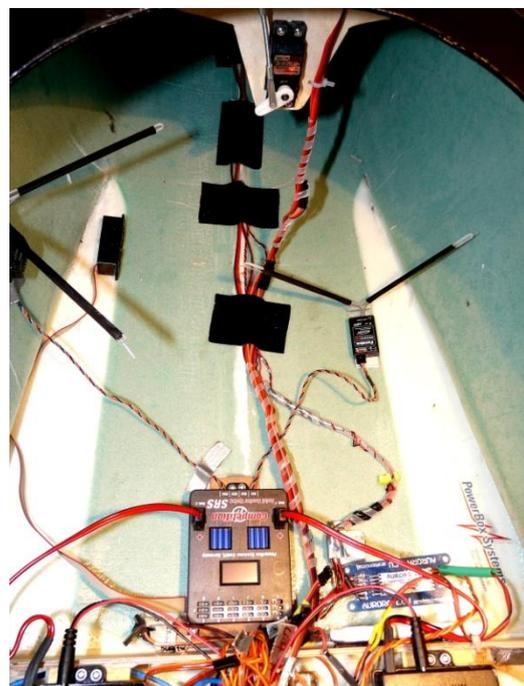
To this theme, we cannot provide definitive installation instructions as the builder is bound to the radio make and electronics at his disposal.



Shown here are the two 7.2V 2800mAh LiPo batteries. We recommend waiting till the build is in the final stages before installing them in a permanent location, as the relatively high weight can be used to advantage when setting the Center of Gravity.

In our example here, two FUTABA S-Bus receivers, and a Competition SRS redundant power supply (PowerBox-Systems) are used.

We highly recommend using, in high quality models, a redundant power supply and dual receivers as they greatly contribute to operational security.



### 3.6.4. Scale Cockpit Kit Detailing



The cockpit kit (included) consists of various vacuum-formed parts that must be cut out and painted.

In the photo, an example of the instrument panel is shown. The self-adhesive instrument faces are provided with the kit.

The rear of the seat-backs are closed using Depron or balsa, then the seams smoothed over with light body-filler.

The seat-backs are then glued to the seat cushions.



Before painting, the plastic surfaces should be “keyed” with a light sanding or wiping with Acetone (CAUTION: Acetone will dissolve the plastic if too much is used! Practice with a piece of scrap - very little is needed for this step).

The mounting position of the cockpit floor is determined by the base of the cockpit side panels. To this end, the side panels - consisting of a front and rear part – are fitted. They are made up of a front and rear part, which can be glued together and

installed as a unit, or installed separately.

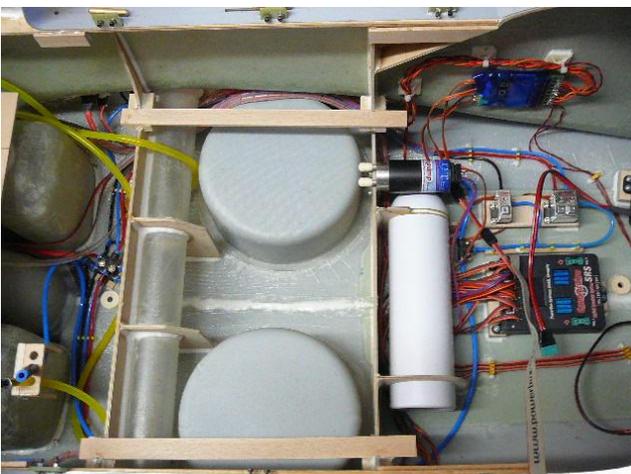
**NOTE:**

**Install the side panels with the base angled in slightly toward the fuselage center-line, otherwise there will be a crack between the side and floor panels.**



The proper fit of the side panels to the floor are best determined by trial fitting, as shown here. Before painting, the attachment points should be determined.

We recommend using small strips of hook-and-loop material (ie. Velcro) to fix all of the cockpit parts in place to allow access to the fuselage radio/electronics area when needed. For this, attachment points/bearers (balsa or lite-ply strip) must be worked into the fuselage (material not included).



The photo illustrates the balsa bearers for the one-piece side panels and the two floor sections with seats. A few small sections of hook-and-loop material are then glued to the bearers. Use only small sections of the material or you may have problems getting the part out without damage.

**NOTE:** In this example, for balancing reasons, the air tank, batteries, smoke pump and power management system are installed behind the last fuselage

bulkhead.

## 4. Miscellaneous

### 4.1 Tail Cone



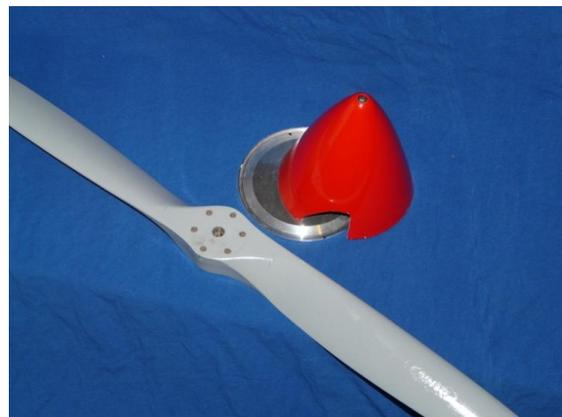
The (optional) white tail light should be installed before fitting the tail cone. The tail cone can be attached however preferred with silicone adhesive or screws (attachment materials are not included).

Before mounting the tail cone, check that the contact surfaces (trial fit) mate cleanly.



### 4.2. Spinner and Propeller

The 120mm spinner and backplate is available from CARF.



The spinner base-plate must be fitted (drilled) to fit the prop drive of the appropriate motor.

### 4.3. Center of Gravity (CG)

As described earlier, the CG can be achieved thru the positioning of the heavy components (batteries, etc.).

**The CG of the completed model (tank empty, wings mounted) is at the leading edge of the wing tube.**

Supported at this point, the nose of the model should hang slightly down.

For those with small workshops, the CG can still be controled without the wings. In this case, all other components must be mounted (with elevators, tank empty).

**In this configuration, the CG is 25mm in front of the wing tube.**

### 4.4. Control Surface Travel

The following values are to be taken as initial settings. After the first couple of flights, the values can be adjusted to taste.

Elevator:	+40 / - 35 mm, Expo 40%
Aileron:	+25 / - 30 mm, Expo 35%
Rudder:	R/L 45 mm, Expo 30%
Flaps:	Takeoff: - 20 mm (vom Querruder gemessen)
	Landing: - 80 mm (vom Querruder gemessen)

#### Attention!

**When the nose gear is retracted, the steering servo should be switched off, (computer transmitter function – if available) to prevent the servo from stalling when rudder commands are given.**

## 5. Technical Specifications



**112" (2830 mm) w/ tip tanks**



**93" (2370 mm)**



**1900 inch<sup>2</sup> / 123 dm<sup>2</sup>**



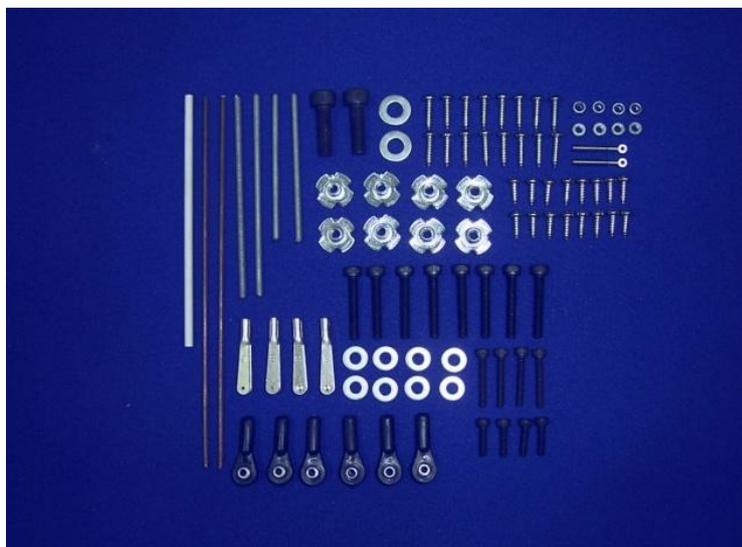
**33 - 35 Lbs (15 - 16 kg) dry**



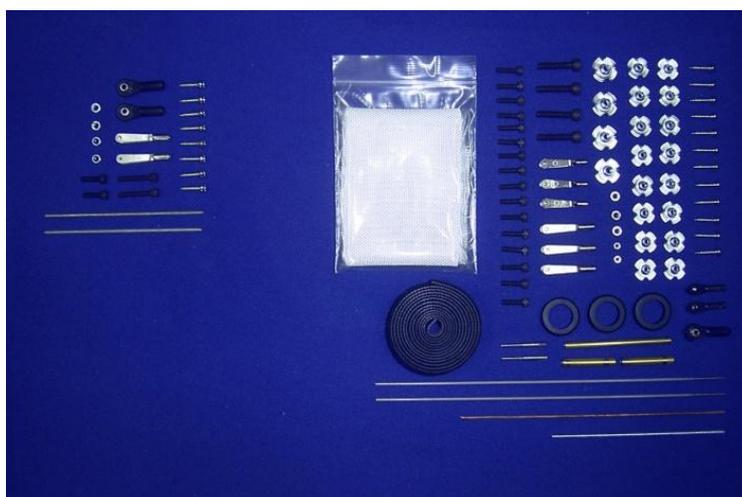
**60 cc single - 120 cc twin 2stroke, 100 cc Moki 4stroke**

**Appendix:**

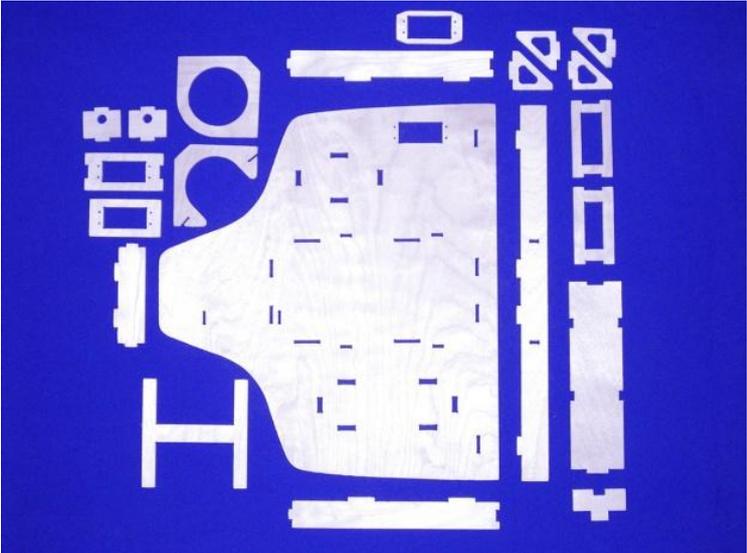
**SIAI Marchetti SF-260, 1/3<sup>rd</sup> scale kit (Version 1.0)**



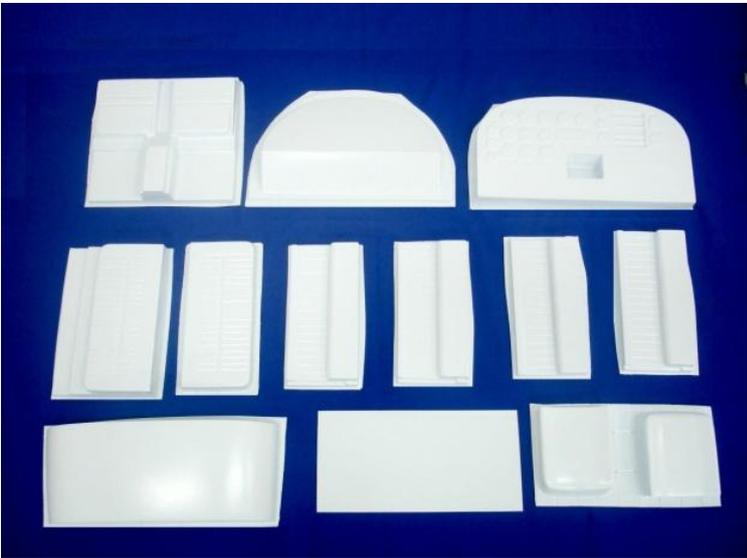
**Wing Pack**



**Fuselage Pack 1**



**Fuselage Pack 2**



**Cockpit Pack**

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