Rafale C

for AMT Pegasus jet engine
or for Jet Cat P-120 / P-160

Assembly Manual

AVIATION DESIGN
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The ***Rafale*** from **AVIATION DESIGN** is designed for the new high thrust jet engines with special inlets and ductings.
It is a scale kit, with all the panel lines engraved in the fuselage and a lot of scale details (gears, hinges, cockpit...). It is fully molded in fiberglass, carbon and epoxy. Up to 70% of the work is done in our factory.
The flight characteristics are excellent with very low and high speed capability.
The model has plug in wings and fin.
The Rafale will operate from prepared grass fields (80 meters long) or tarmac surfaces.

KIT FEATURES

- A high quality epoxy-glass fuselage in 2 parts with grey gelcoat finish.
- Exhaust nozzles.
- Access hatch requiring no framework for ***Rafale C*** single seater version or ***Rafale B*** twin seater version.
- Epoxy-glass inlets.
- Fully molded wings, fin and canards.
- All the plywood formers and the necessary wood are already glued in fuselage.
- ABS cockpit interior and scale accessories.
- A clear plastic canopy for ***Rafale C*** single seater version or ***Rafale B*** twin seater version.
- A decal sheet, full size CAD plans & instructions.
- Hardware package (includes ball link M3, threaded rod, Aluminium control horn and hatch latches)

To complete the kit :

The following items are not included in the kit. They are available from **AVIATION DESIGN**.

Jet Engine, tanks :

1 Complete **AMT Pegasus** or Olympus jet engine
or 1 Jet Cat P-120 jet engine or 1 Jet Cat P160

Landing gear : ref : ADJ 257

Including complete retracts with 3 scale oleo legs.
It also includes valve, tubing, connectors, air tank, filling valve.

Wheels set + brakes : ref : ADJ 259

This set include:
2 x 115 mm diameter wheels + scale cover + brakes
2 x 55 mm diameter front wheels
It includes valve, tubing, connectors, air tank, filling valve.

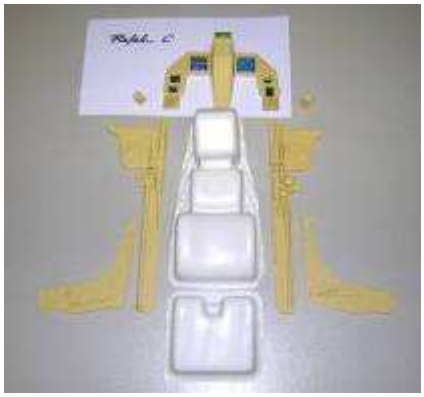
Variable pressure brake control valve

Gear doors kit : ref : ADJ 261

Include 3 air cylinders, electronic gear door cycler, 4 way valve, tubing, connectors, air tank, door hinges, ball links

Cockpit detail kit for single seat Rafale : ref : ADJ 255

This kit include : 1/7 full body jet pilot, 1/7 ejector seat & instrument panel.



Cockpit detail kit for twin seat Rafale : ref : ADJ 256

This kit include : 2x1/7 full body jet pilot, 2x1/7 ejector seats & 2 instrument panels.

Rafale probes set : ref : ADJ 267

Include 4 incidence probes, 2 pitot probes & 1 refuelling probe molded in plastic
Also include ECM pod in resin

Fuel tanks : ref ADJ 265

2 Fuels cells . Capacity : 2.4 liters
Includes tubing, nipples and clunks + 1 upper tank

Kevlar Fuel tanks : ref ADJ 264K

2 Fuels cells . Capacity : 4 liters
Includes tubing, nipples and clunks

Single exhaust stainless steel tailpipe for engine : ref : ADJ 280

Twin exhaust double walled stainless steel tailpipe : ref : ADJ 282

2 Magic missiles : ref : ADJ 270

Missile tube is in resin. All fins are precut in ABS
Can be fitted at wing tip launch rail

2 Mica missiles : ref : ADJ 271

Missile tube is in resin , fins molded in resin
Can be fitted at wing tip launch rail or underwing launch rail

2 Underwing fuel tanks (small) : ref : ADJ 273

Fully molded in epoxy-glass with the rail

2 Underwing fuel tanks (large) : ref : ADJ 274

Fully molded in epoxy-glass with the rail

High visibility water decals : ref : ADJ 285A

Low visibility water decals : ref : ADJ 285B

DISCLAIMER

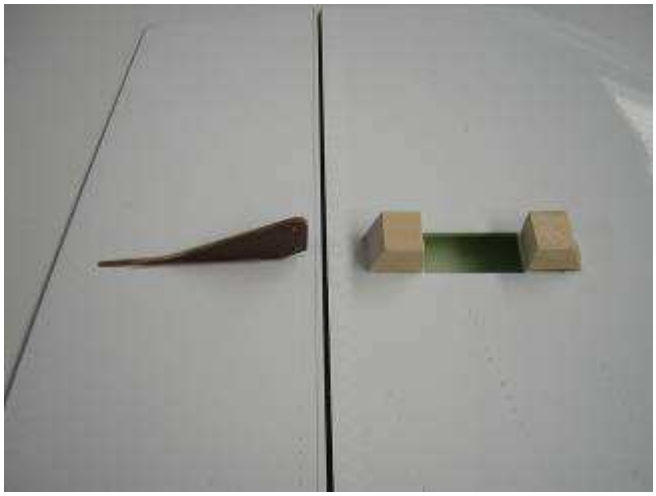
AVIATION DESIGN assumes no liability for the operation and use of these products.
The owner and operator of these products should have the necessary experience and exercise common sense. Said owner and operator must have a valid Model Airplane licence and insurance, as required.

GLUING TECHNIQUES

All the plywood formers should be fitted with cyano adhesive and then glued with epoxy. All other parts should be glued with epoxy.

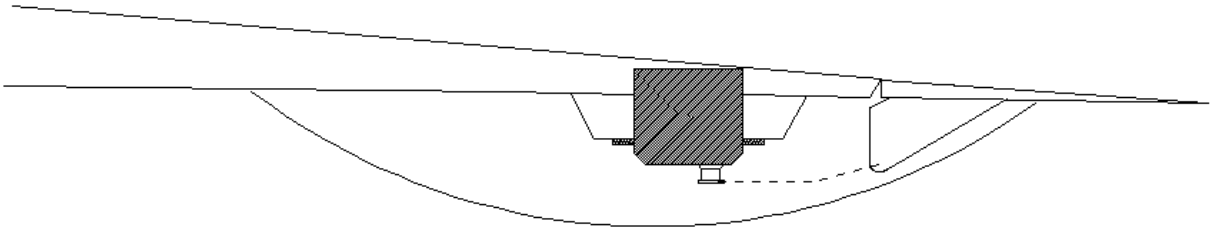
Assembly Instructions

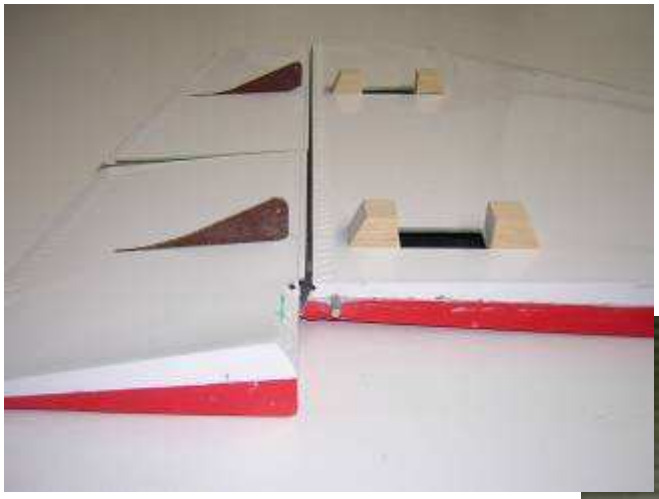
WINGS



Cut a slot in the 2 elevon and glue the 2 control horn with a lot of epoxy
Glue the 2 wood block on the wing for the servo
Connect the servo and the control horn with 2 x M3 links and M3 threaded rod.
Apply thread lock.

Glue the servo fairing under the wing and the elevon.
Glue the missile rails or fix them with nylon screws.

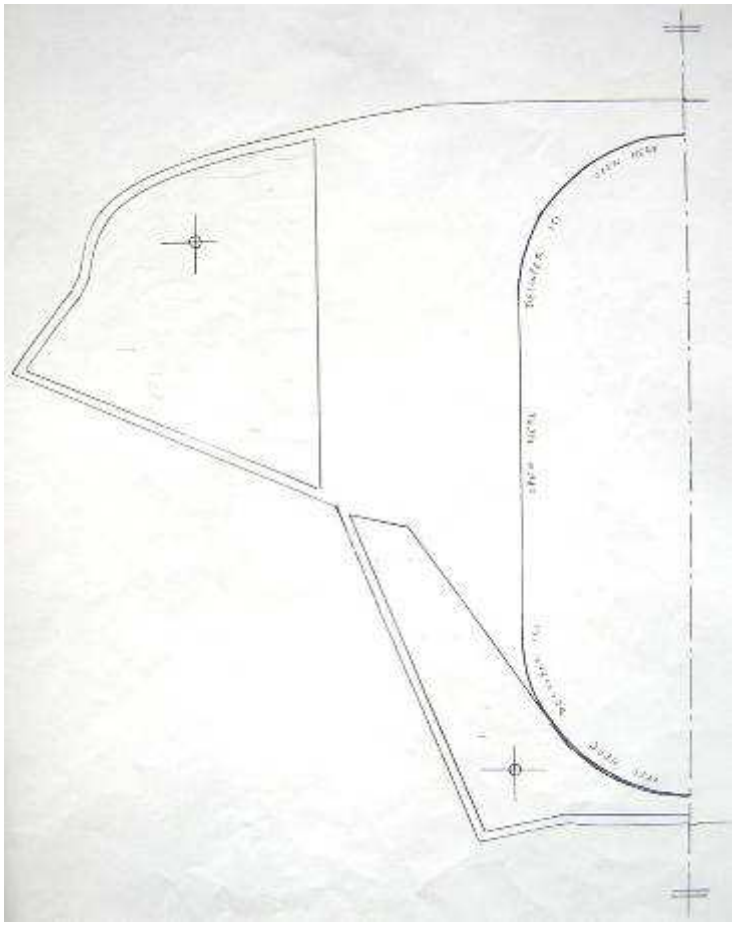




FUSELAGE

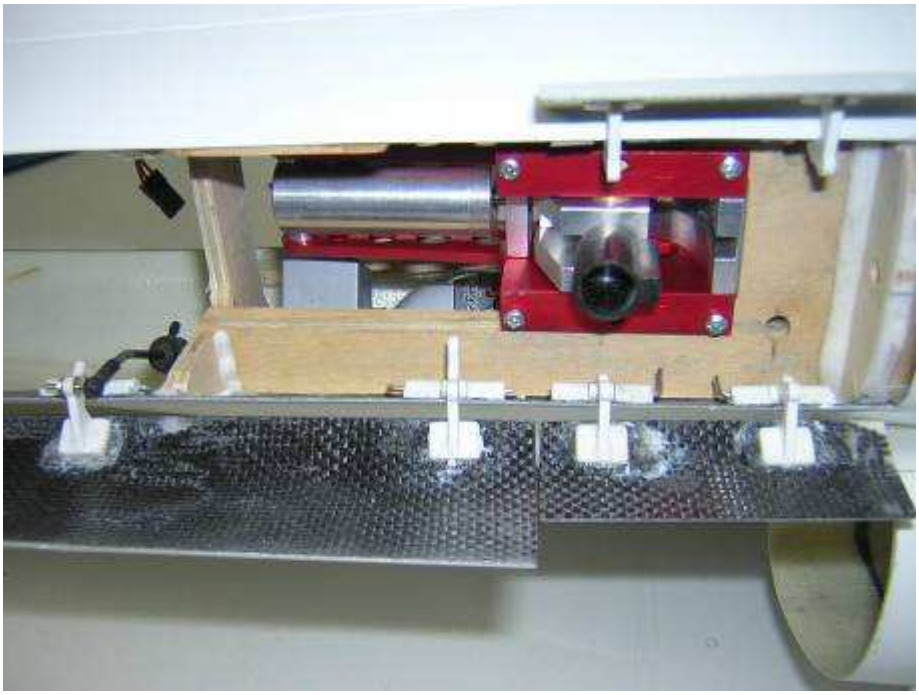
It is possible to let the fuselage Rafale in 2 parts for transportation.
You can also glue the 2 parts together.

If you want to dismantle it easaly, you'll just have to screw the 2 parts together with 3 mm diameter screws.
Don't forget to glue the 4 screws with threadlock before to fly .....



Assembling the nosegear

Cut the front gear doors according to the engraved panel lines.
Glue the 7 door hinges.
Screw the landing gear on the gear mount

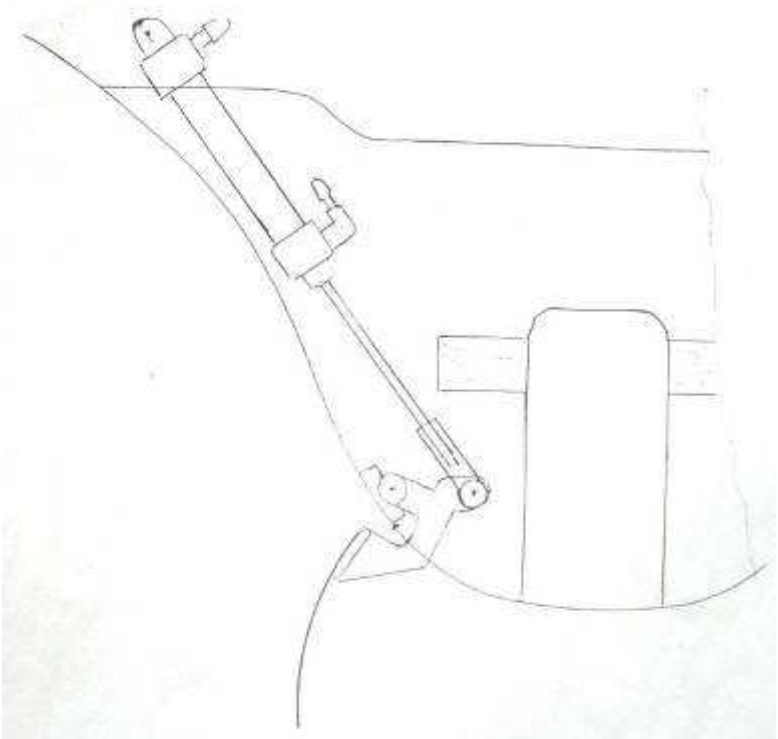


Screw the servos onto C0.
The steering servo should be a 3 kg.cm servo (Futaba S9101)
The gear valve and gear doors valve servos should be 2 x 1 kg.cm servo (Futaba S133)

Electrovalve can be fitted on each side of the fuselage on a plywood mount.

Connect the steering servo with M2 link to the steering arm.

Front gear door :
Screw a ball on the center door hinge.
Screw a ball link on the 1" air cylinder. Screw the air cylinder on a obechi block.
Glue it according to the plan.



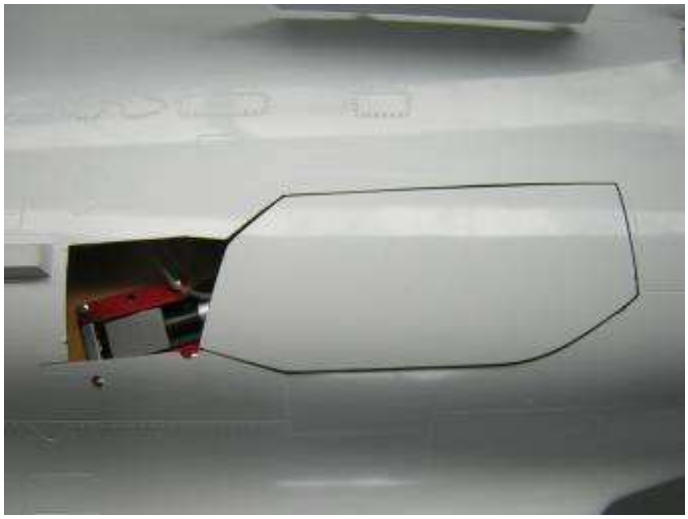
Canard servo.
The steering servo should be a 8 kg.cm servo (Futaba S3302)
Screw the servo on plywood mounting.
Connect the 2 canard tube with the T aluminum arm
Connect the arm to the servo with M3 link

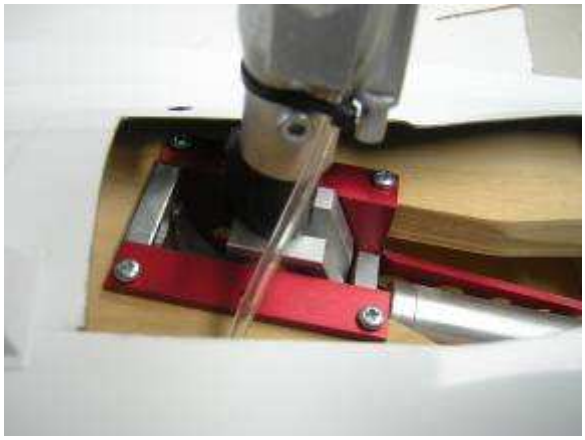
Assembling the main gear

Cut the gear doors according to the engraved panel lines.
Glue the 4 door hinges.

Screw the landing gear on the gear mount with 4 parker screws.

Fit the oleo legs in the retracts and fit the wheels + brakes on the axis.
Check that the 2 wheels are parallel.
Check that the legs extand and retract without problem.





Main gear doors

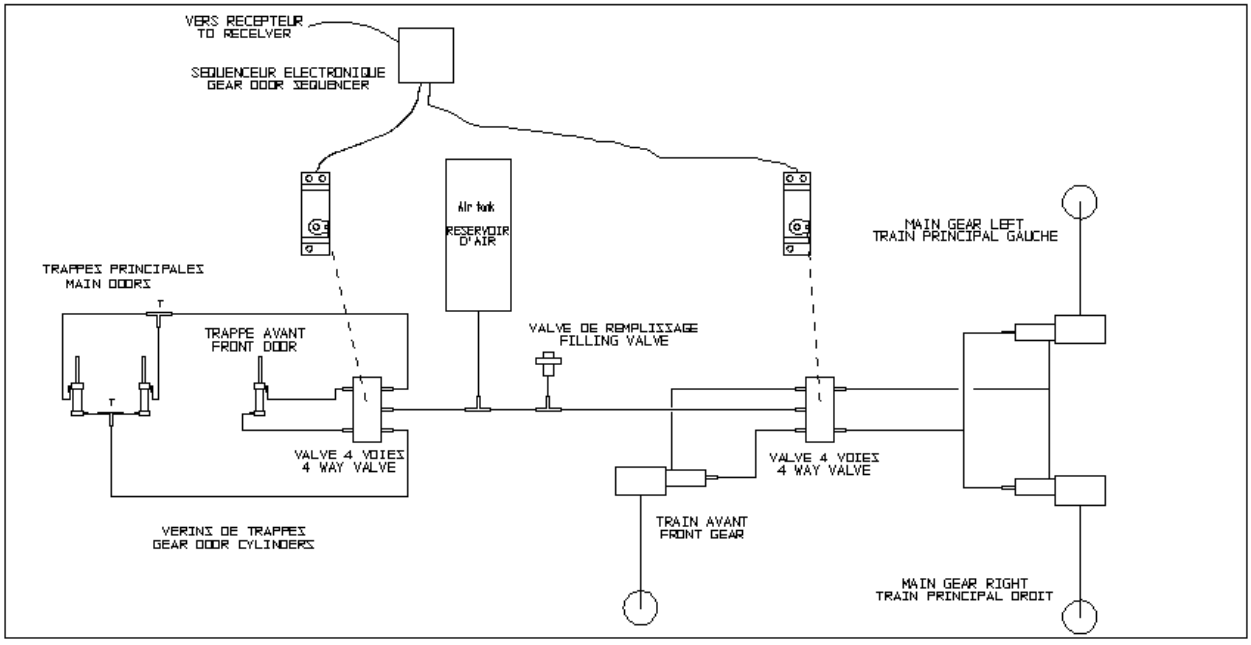
Screw a ball on the plywood part.
Glue the plywood part as the photos. It is glued just at the limit of the gear door.

Screw a ball link on the 2’’air cylinder.
Screw the air cylinder on a obechi block.

Glue the obechi block on the air inlet according to the photos. Adjust the position of the obechi block so that the doors can be opened and closed without problem.

Tubings

Connect all the retract tubing and door tubing according the manual.
Fill the system with an air pump or compressor at a maximum pressure 100 Psi / 8 bars before each flight

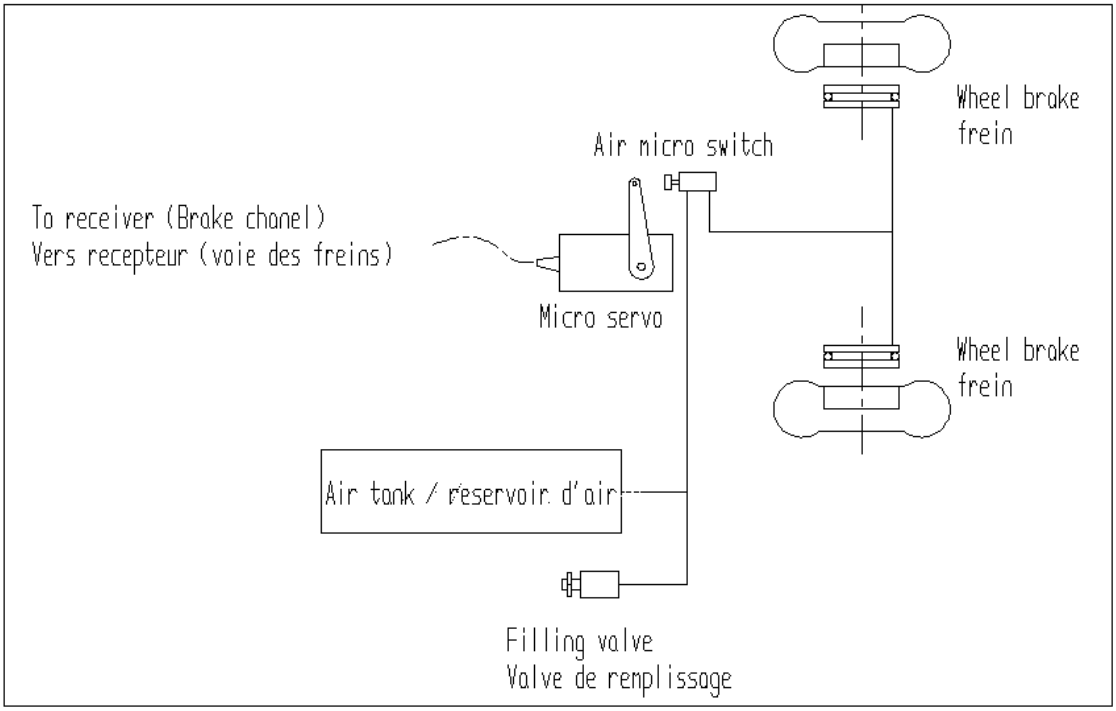


Wheels and brakes

Glue the 6 mm diameter screws with threadlock in the legs
Connect the system according to the manual.

Do not remove the O ring inthe brake drum
Separate rubber tires and O ring are available in spare parts.

Usually, we use the brakes on fully elevator down stick.
Fill the system with an air pump or compressor at a maximum pressure 100 Psi / 8 bars before each flight



Variable pressure brakes control valve :

Connect the valve instead of the air micro switch
Usually, we use the brakes on elevator down stick. The braking effect will be proportional to the stick travel.

Assembly of the fin :

Slide the fin on the fuselage.
Drill a 2 mm hole and insert a 2.5 mm screw to lock the fin through the aluminium tube.

FUSELAGE HATCH

Glue 4 hatch latches and drill the corresponding holes in the fuselage..

CANOPY

Put the clear canopy on the fiber parts and cut is 5 mm bigger than the clear canopy parts.
Cut the fiber canopy as engraved on the canopy Cut in the canopy frame all the real glass.
Drill one hole in the canopy frame for the hatch latch pin and pin.
Glue the hatch latch to the fuselage.
Glue with CA all the ABS cockpit interior parts and paint them.
Fix the pilot.

Gluing the clear canopy :
Put the clear canopy inside the canopy frame.
Hold it with paper tape
Apply some ZAP canopy inside the frame between the clear canopy and the fiber parts
Let in dry 24 hours

Glue the hatch latch to the fuselage.

CANARDS

It is necessary to balance the canard by adding some lest in the leading edge.
Connect the 2 canards together according to the plan.
Be sure that the 2 canards are at the same angle of attack.

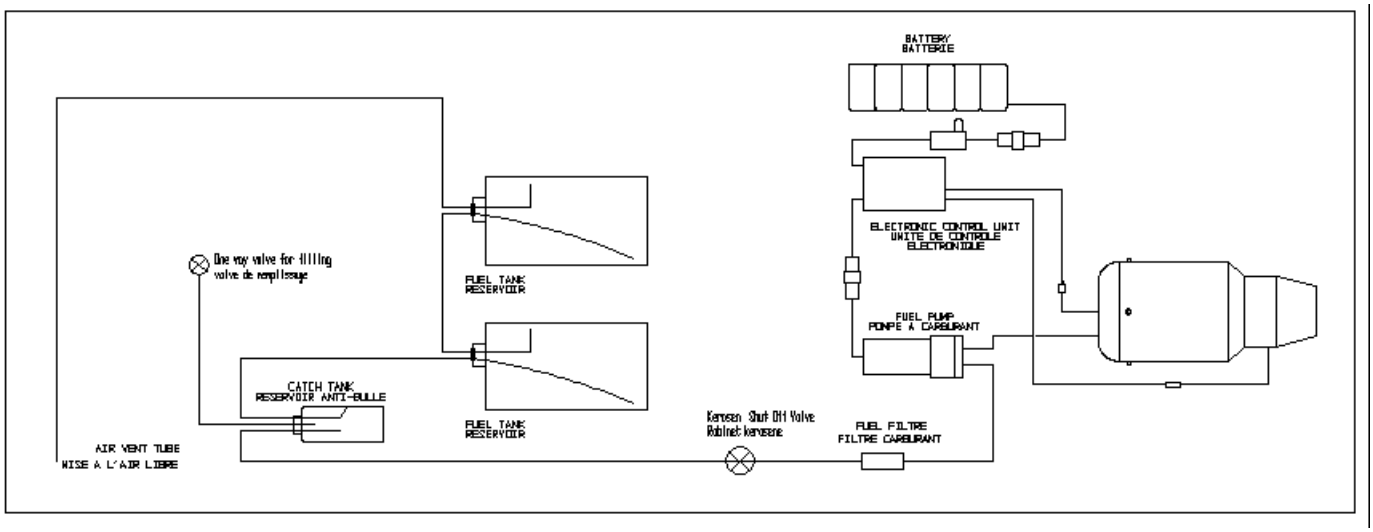
Connect the servo and control horn with 2 M3 links and M3 threaded rod.
Glue them with threadlock.

Installation of the AMT jet engine.

The AMT is just screwed with 4x 3mm diameter srews on plywood engine mount with blind nuts.

The ECU and the AMT Batterie is put in the nose close to the landing gear.

With this configuration, the Rafale don't need any ballast to balance the model. Balance the model with the gear down and the fuel tanks empty.



Fuel tanks :

You can fit plastic or kevlar fuel tank in the Rafale
Plastic tanks are 2 x Dubro tank (2 x 1200 cc - 2 x 40 oz).
Kevlar fuel tank are conformal fuel tank with a 4 liters capacity
They just slide on each side of the air intakes.
This fuel tanks are connected to a UAT catch tank (optionnal) to be sure that there is no bubble in the fuel line.
The tubing from the main tanks to the catch tank and to the catch tank to the fuel pump must be gasoline tubing (no silicone tubing). Also for the air vent tube.
The catch tank is glue with double face tape on the bottom of the fuselage just in front of the air intakes.

Filling the fuel tanks :

Connect your pump and fill the system in direction of the catch tank. It will first fill the catch tank and after the main tank. The main tank will be full when fuel come from the air vent tube.
When tanks are full, close the filling tubing.
Do not close the air vent tube.
The system is ready for starting.

TAILPIPE EXHAUST

If you use a single exhaust pipe, cut the fiberglass exhaust nozzles like the plan.

The exhaust nozzles and the tail fairing are glued onto the rear plywood frame with CA.

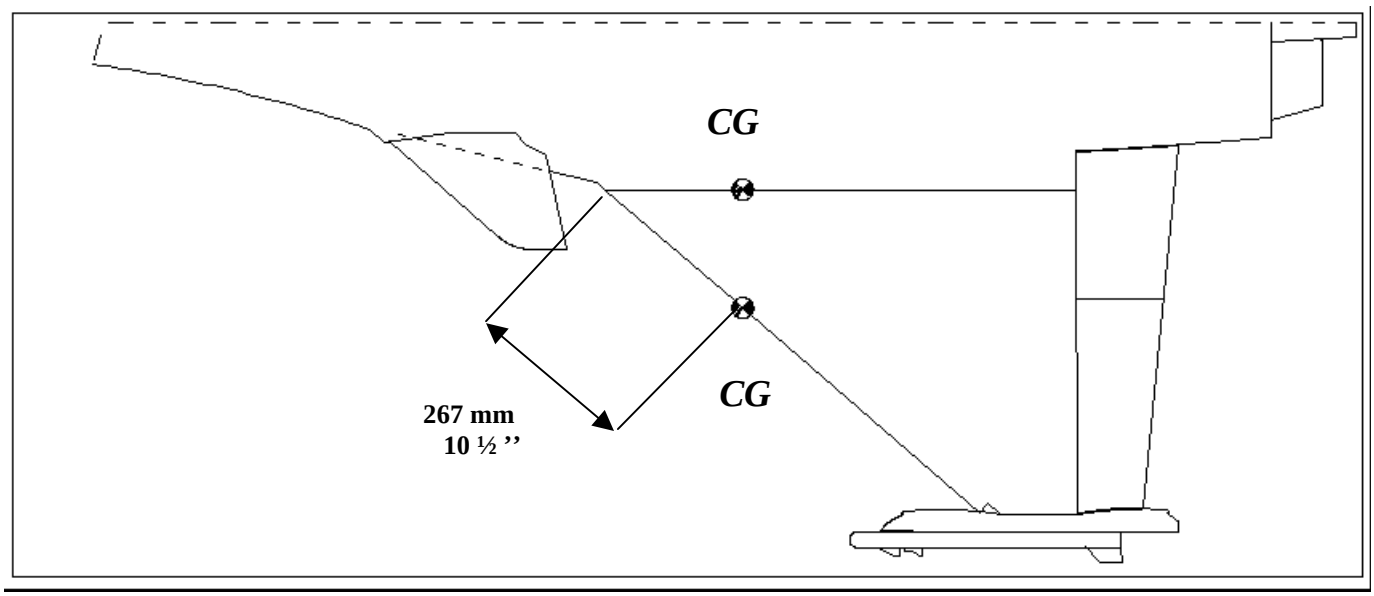
Rear plywood frame will be screw at the rear of the fuselage with ply blocks.

Protect the under tail fairing with 0.1 mm aluminium sheet

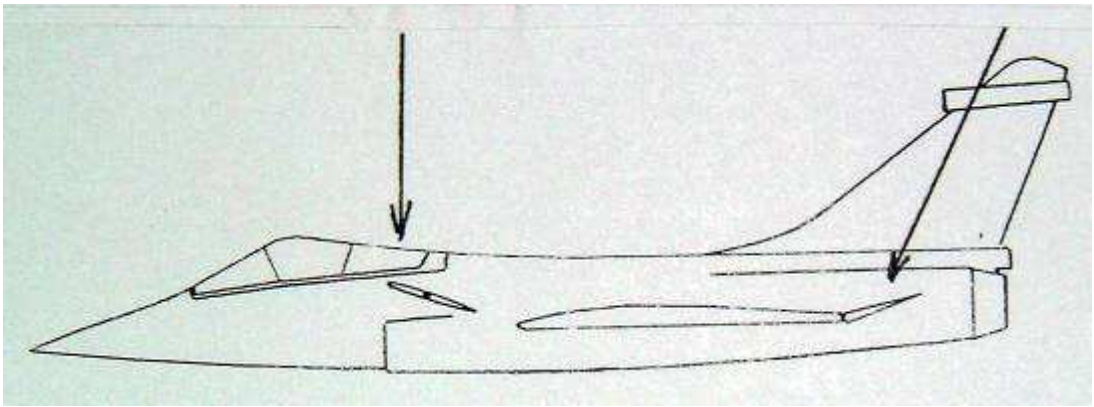
Installation of the radio equipment

Components need:
Elevons : 4 servos 8 kg torque (ex : S9402)
Canards : 1 servo 8 kg torque (ex : S9402)
NG steering : 1 servo 3 kg torque
Retract + gear doors : 2 servos 1 kg torque
Receiver and switch
2 batteries 1600 mah

You normally need two 1700 Mah battery power to have a correct Centre of Gravity.
Note : balance the model with the gear down and the fuel tanks empty.



You also need 2 electronic mixers on your radio.
You must mix the 2 elevons like a delta and you must mix the canard with the elevator.
When you pull the stick back, the leading edge of the canard should go up the same as the trailing edge of the elevons.



Recommended surface throws

Canard

Up 30 mm at the leading edge
Down 5 mm at the leading edge

Elevon

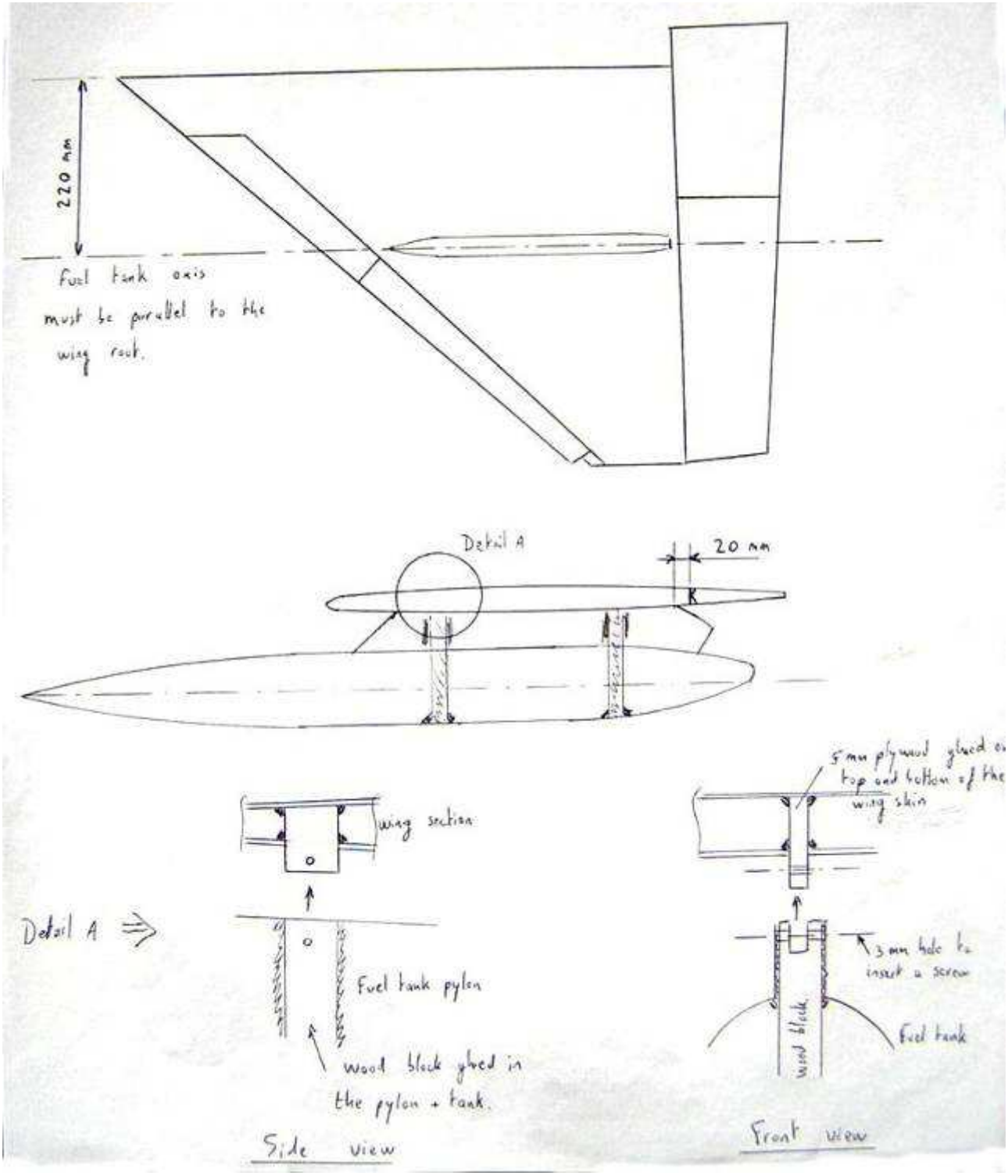
In roll : 12 mm up and 12 mm down
In pitch : 15 mm up and 15 mm down

All measured in the widest part of the surface

The total weight of the Rafale is 11.5 to 13 kg, tanks empty.

Important note : Pay very careful attention to structural integrity. This jet can reach speeds of over 300 KPH. It is your responsibility to operate it safely.

Specifications may change without notice.


220 mm
Fuel tank axis must be parallel to the wing root.
Detail A
20 mm
Detail A ⇒
wing section
Fuel tank pylon
wood block glued in the pylon + tank.
Side view
5 mm plywood glued on top and bottom of the wing skin
3 mm hole to insert a screw
wood block
Fuel tank
Front view

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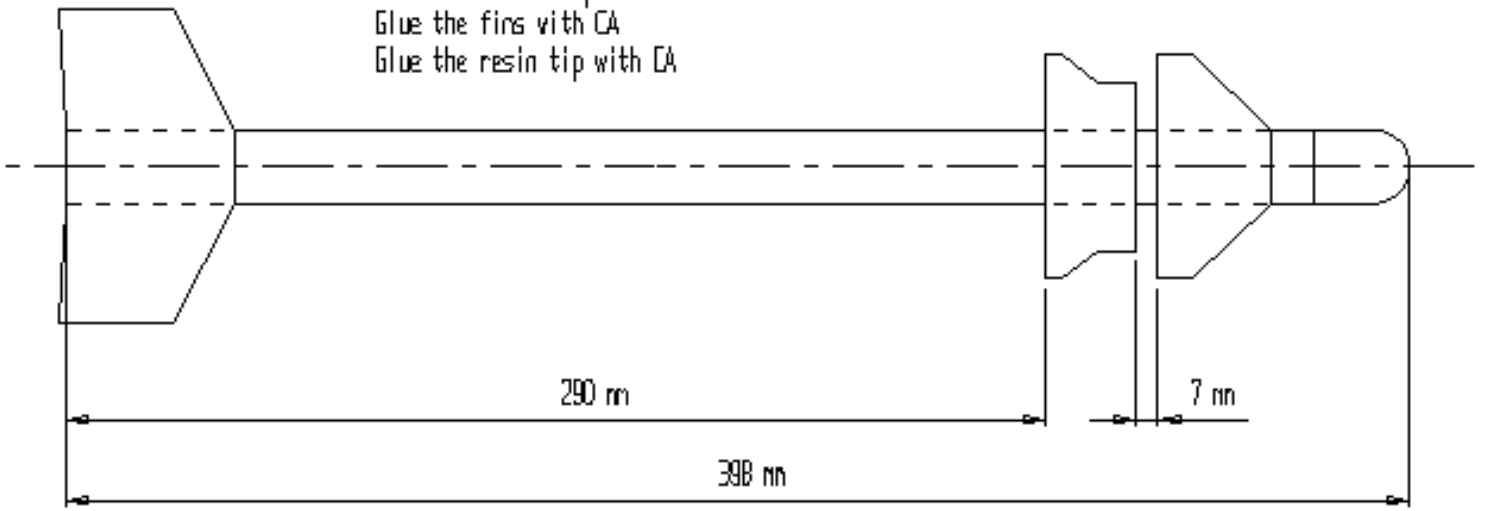
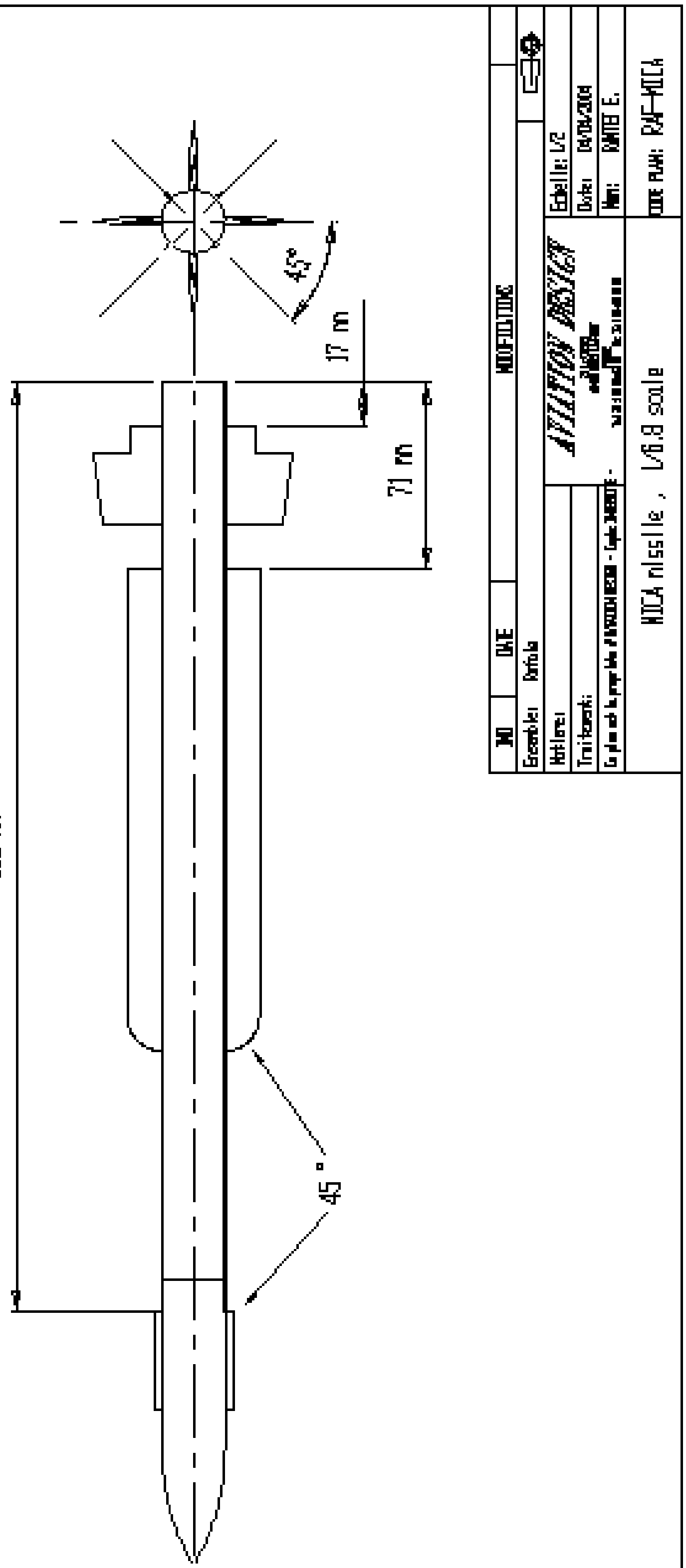
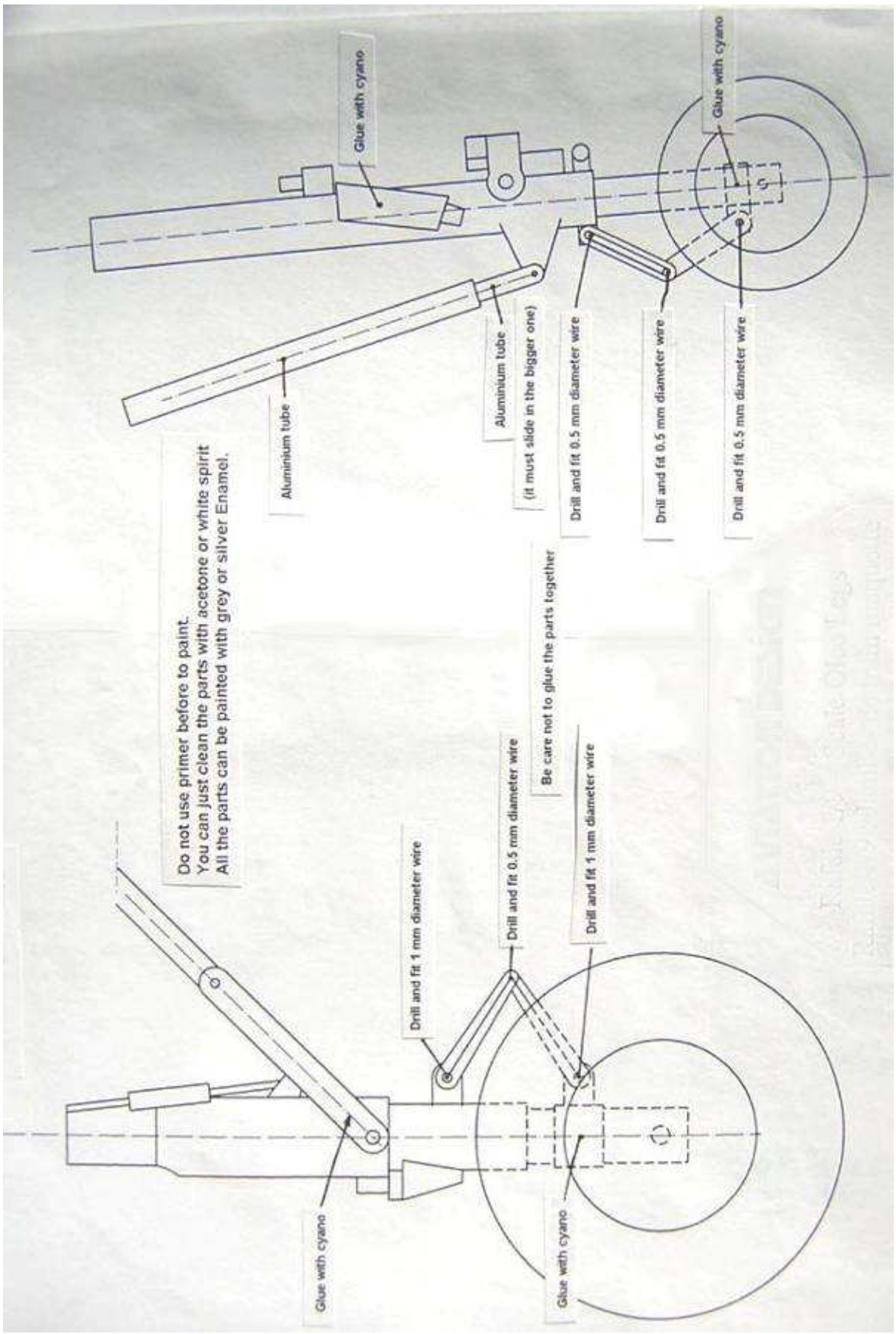
Cut the tube with perno Grit disc for all fin location
Glue the fins with CA
Glue the resin tip with CA



IND	DATE	MODIFICATIONS	
Ensemble: Fusée			
Matière:	AVIATION DESIGN	Echelle: 1/2	
Traitement:		Date: 04/04/2004	
Copies soit la propriété d'AVIATION DESIGN – Copie INTERDITE –		Mme: RAMET E.	
Magic missile , 1/6.8 scale		CODE PLAN: RAF-MAGIC	

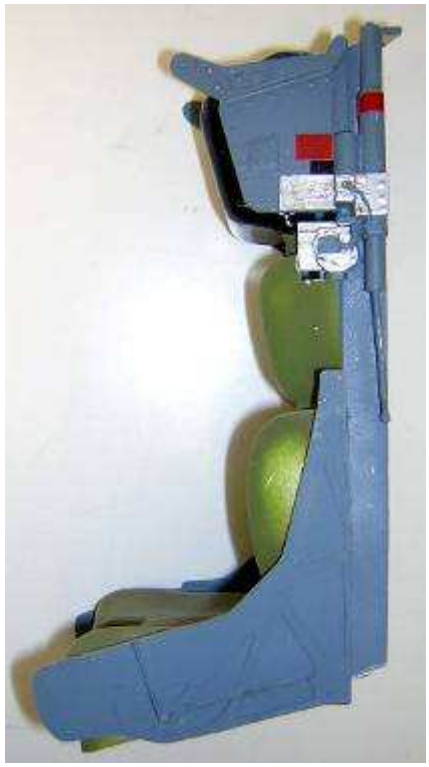

45°
17 m
71 m
353 m
45 °
MICA missile , 1/6.8 scale

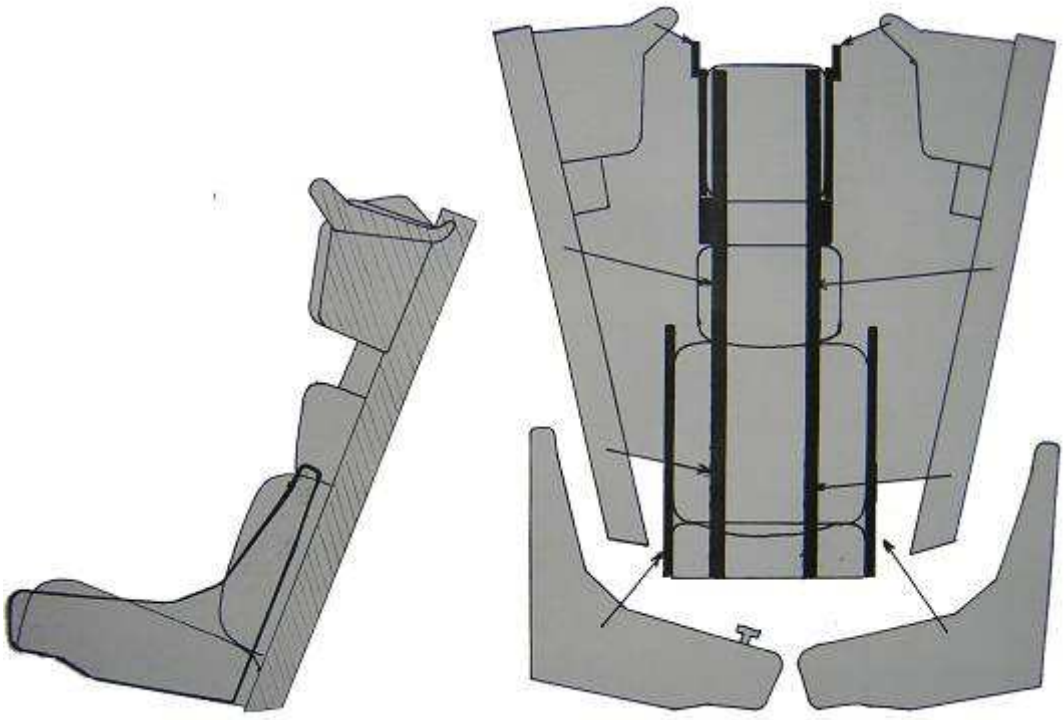

Glue with cyano
Glue with cyano
Aluminium tube
Aluminium tube
(it must slide in the bigger one)
Drill and fit 0.5 mm diameter wire
Drill and fit 0.5 mm diameter wire
Drill and fit 0.5 mm diameter wire
Do not use primer before to paint.
You can just clean the parts with acetone or white spirit
All the parts can be painted with grey or silver Enamel.
Be care not to glue the parts together
Drill and fit 1 mm diameter wire
Drill and fit 0.5 mm diameter wire
Drill and fit 1 mm diameter wire
Glue with cyano
Glue with cyano

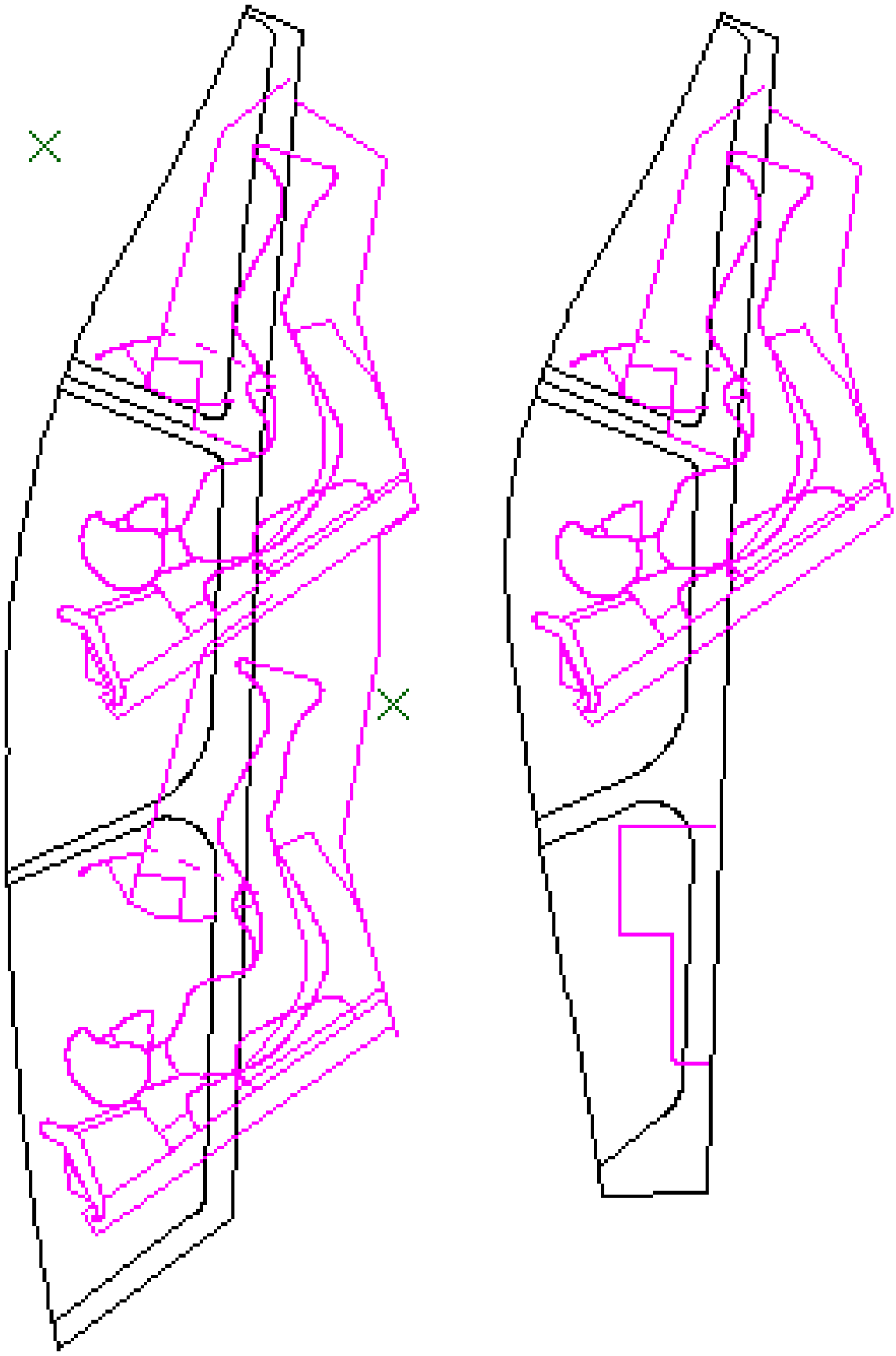
Martin Baker MFK 10 ejector seat

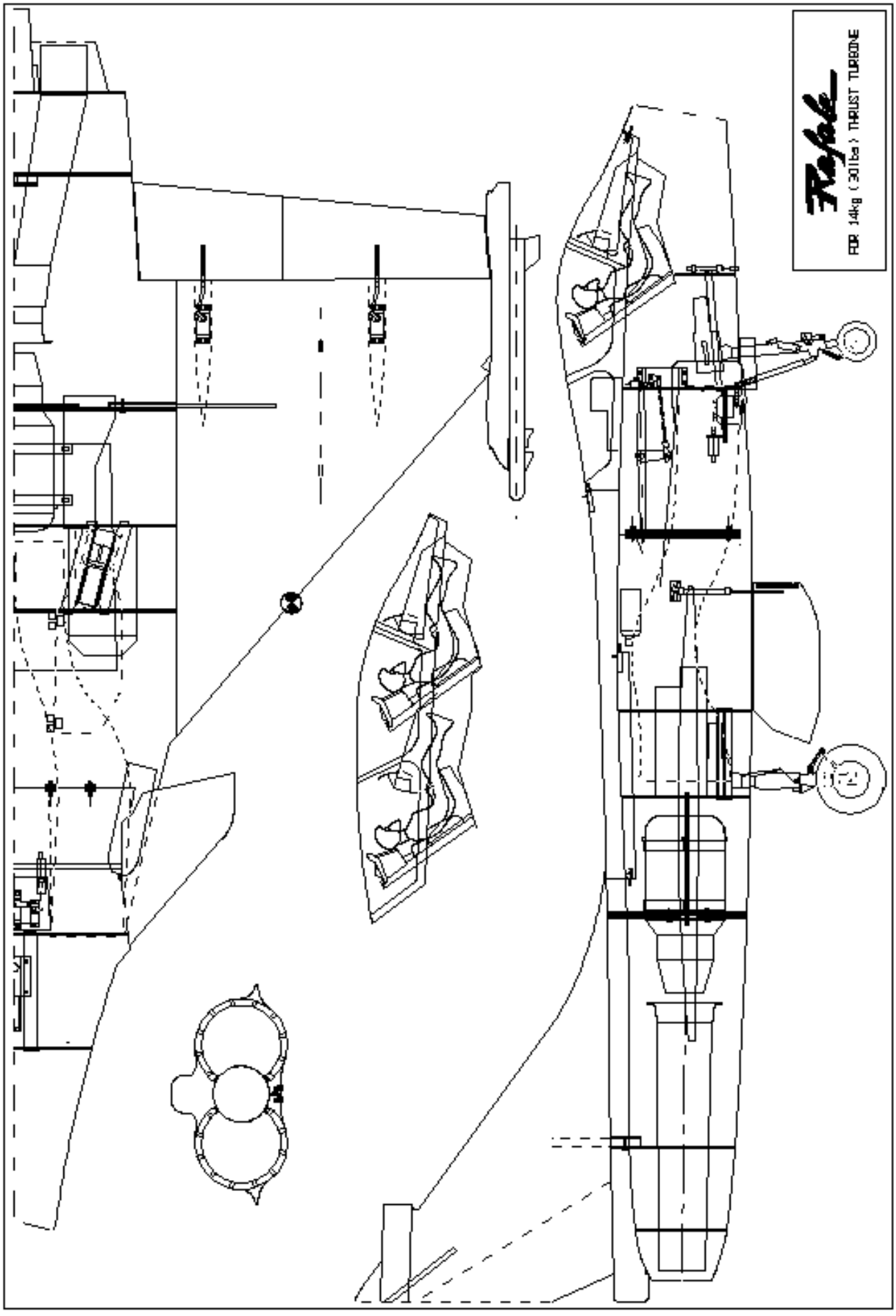
The Martin Baker ejector seat is perfect to complete your jet model.

1- Paint : You can paint directly all plastic parts without sanding.
Use Enamel paint #144 and #98
2- Cut vacuum parts with small cisor
2- Glue : All parts can be glued together with cyano according to the plan.
Remove paint before to apply some CA on parts








Rafale
FOR 14kg (30lbs) THRUST TURBOJET