

A giant full composite jet kit

ARES

Ares **XL**

KRILL Aircraft

SebArt
International



The all new Sport/3D jet is a masterpiece!! Designed by Italy's Sebastiano Silvestri. Developed and produced by Krill Aircraft. Its design is based on a hawk aircraft. Then been improved further with aerodynamic ideas learned on other pattern models. Also the unique fuselage design makes is easy to perform knife edge flight with ease. It is a very lightweight and strong construction. This helps as the flight speed range is really impressive!! Designed to take an engine with 180N of thrust, it is setup to be an ideal jet trainer BUT with a 250-300N turbine, you have the ultimate 3D jet!!

This will let you into a totally different flying experience!!

Assembly manual.

Specification:

Wingspan:...2.7m

Length:....3.3m

Weight: RTF dry (P300) 21 kg

Setup range of installation:

Turbine:.....from 180N to 300n

radio:.....12-18 channel radio system

servos:10 digital, metal gear servos.

1.

Required Radio, batteries and turbine

Digital servo:8 20kg/30kg servos are more than adequate.we recommend the :Macgregor MG 7232 (aileron, elevator, nose steering flaps and rudder)
(2 JR ds 8915(vectoring thrust-optional))

- Optional landing gear set from Electron or JP retracts
- Powerbox systems range from:
Sports OR 3D setup: Powerbox Mercury or Powerbox royal.
- We recommend using a Powerbox smoke pump
- RX Batteries can be from 2500-3500mah-2s Lipo

Recommended turbines:

- For Jet beginners:p180 N
- For FAI F3S aerobatics:180 N to 220 N

For 3d unlimited flight:300 N 400 N (vectored thrust pipe optional)

Recommended tank:

- CM JETS kero+Smoke (optional with kit) also FCT -U.A.T
- **3d setup users** with 250n or more. The fuel systems must have a high flow system.
BISHOP AVIATION: **CMJETS** fuel and smoke is designed for this aircraft and perfect for the Ares.also to be Used with a high flow composite fuel trap.

1. Wing Assembly Aileron (flap servos and horns)

Aileron servo

Assemble the aileron and flap by sliding the brass tube through the hinge line holes. You can secure the hinge rod with a touch off zap CA.



The aileron Servo horns should be 30mm long to get the travel above the wing skin. Both ailerons should setup exactly the same.



The Gabriel horns should be set so the ball joint center is directly above the elevator hinge line. It works out about 15mm back from the tail skin when the elevator is in the neutral position. Make up the rod length at approximately 115mm long from ball to ball.



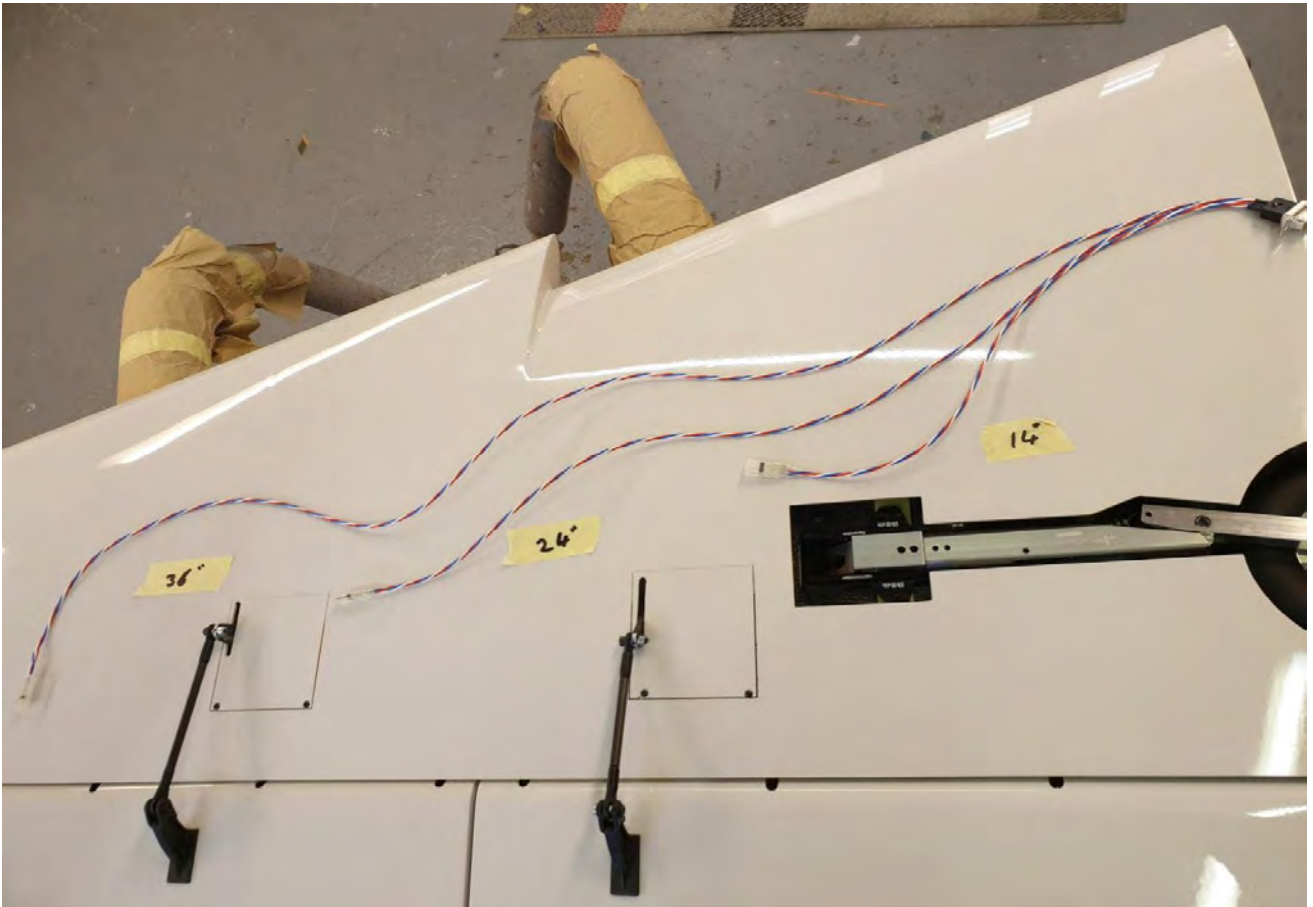
Flap servo

The flap horn should be glued also 20mm back from the wing skin. Repeat the stages that you did for the ailerons. The only difference is the rod length, which if you don't want full length ailerons will be 95mm.

Flap end point does not need to exceed around 40 degrees off movement.

(See 3d options at the end of the manual if you require full length ailerons).

Aileron and flap wire install



It is easier and safer to use PowerBox dual and triple servo wire, multiplex leads for the wing join. See picture below for the length of the wires. 36 inch's / 24 inch's / 14 inches. These wires are rooted through the front half of the wing face and under the intakes and down the middle trench. This makes them invisible from the intakes at the front.

2. Retracts



Electron option



JP option (ideal for 3d performance)

First retract the leg and slide into the fixing plate to trail fit. make sure that the retract is sitting low enough to be completely covered by the wing skin. With electron retracts you may have to adjust the rake back on the leg to get it the same shape as the cut out. when you are happy that that the retract is sitting and not tight on any former's or skin, you can now drill 4 5mm holes. insert claw nuts under the carbon reinforced plate. After bolting the retract in you may find the wheel will touch the main root rib. To solve this problem add a shim accordingly to the retract to adjust the end point off the retract leg. shown in the picture below.

You can also add a hatch around the retract for better looks. but is not necessary.

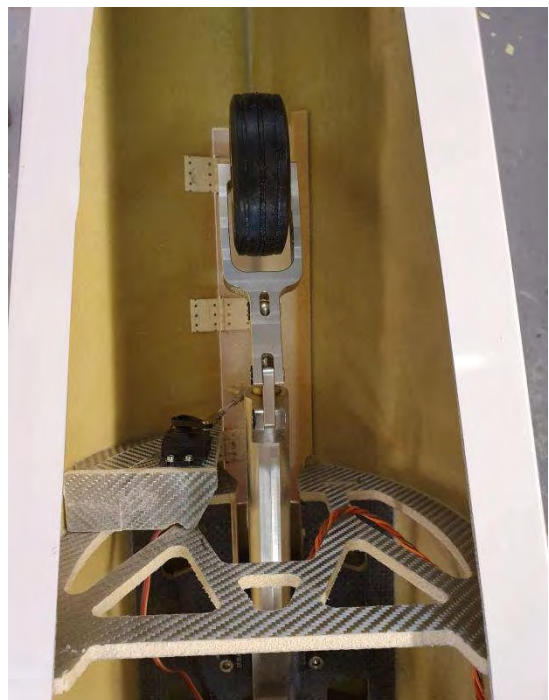


Nose retracts

Retract the leg so it is in the fully gear up position.

Trail fit the retract on the mounting plate. when you are happy that it fits without any chance of fowling on the former's or fuselage. you can now drill and bolt **one** in. A nice trick to get the retract inline is to retract leg until it is half way in the door cut out. now you can see if it is in the middle of the cut out. after making small adjustments to get it inline you can now drill the remaining 3 holes for the 5mm bolts and claw nuts. (**please note the design of the door and leg position allows you to close the door after the leg is in the gear down position**). so you will need to make a cut out behind the door, into the fuselage to allow the leg to ride past the door.

After all the bolts are tight if you notice from looking from the front, that the retract is angled. you can raise one side of the retract with washers or shims. This may take some time to get right!!



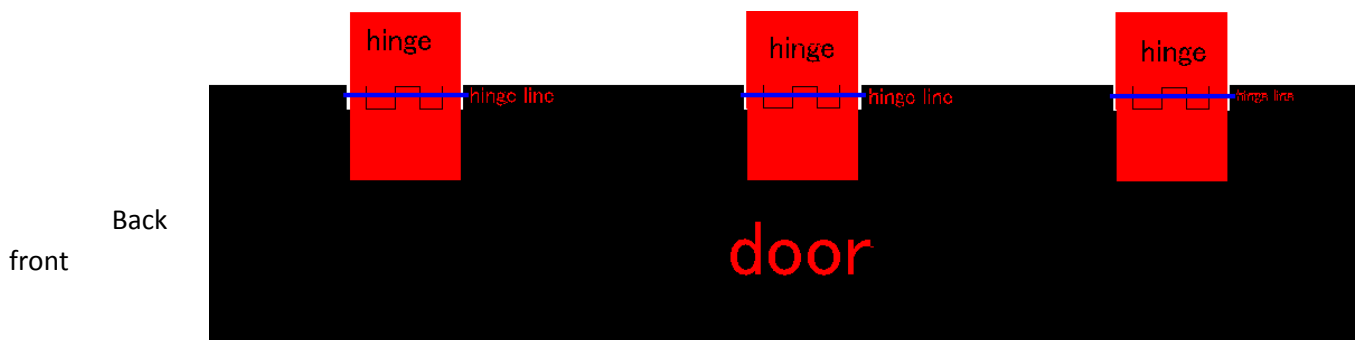
Front Door assembly

The front door is optional. if you are intending to fly 3d hovering, this is weight that can be saved to give you a little more performance. However, the overall look in the air is more pleasing and streamlined with it on,

First, trial fit the door to the opening, work out the best direction it fits, as this has been cut out from the fuselage.

Sand if needed as you are looking for a 1 mm gap all the way round.

Now you must fit the flat hinges to the door. Mark where the hinges are going on the door and cut out an inlay in the door to take the hinge line raised part.



Hinge spacing should be 20mm in from both ends and then one in the middle.

CA all three hinges in the position shown above.

Now you need to remove the foam core where the hinges go on the fuselage side, so that the hinge is as close to the skin as possible.

Next you can tap the door to the fuselage in the closed position and make sure there is a big gap on the side with the hinges.

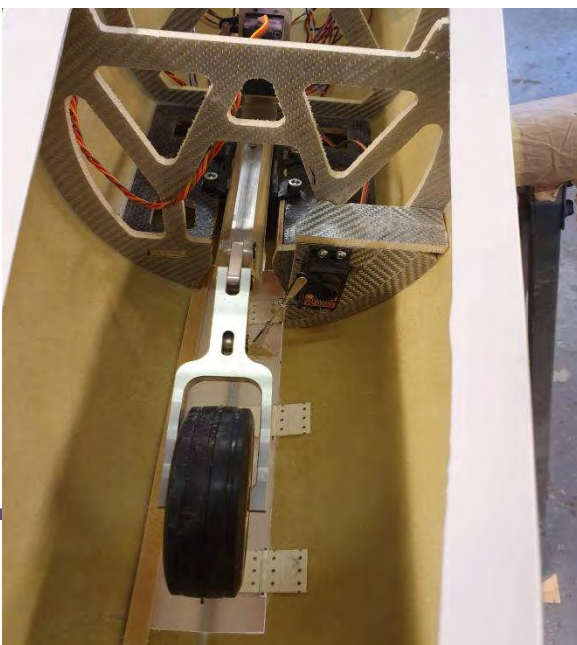
Next you can glue the other side with CA from inside the fuselage at the top.

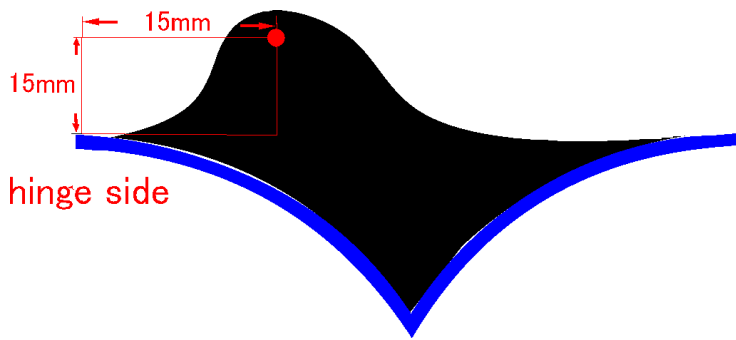
Then remove the tape and check to see that it moves. If it is catching slightly, you can run some sandpaper in between the hinge line gap to refine it.

When you are happy, you can now make it work from either a servo or an electron actuator.

See picture below that shows the servo method.

The door horn will have to be made from 2mm epoxy sheet.



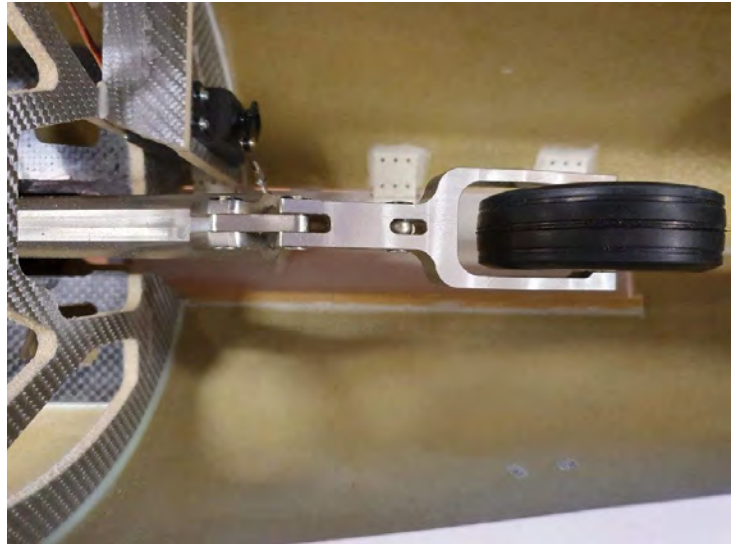


when you have tested that it all works and the leg clears the door and control horn . you can epoxy or hysol all joints for a stronger bond.

electron actuator.these are very strong and provide a more linear movement perfect for doors.



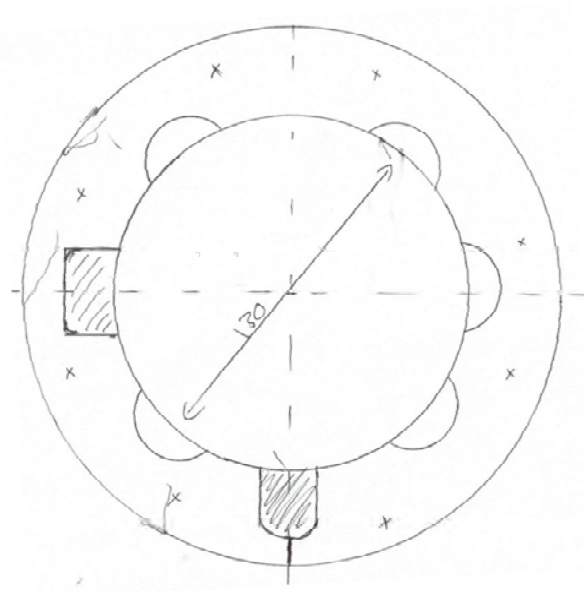
You can also have the optional extra which is a

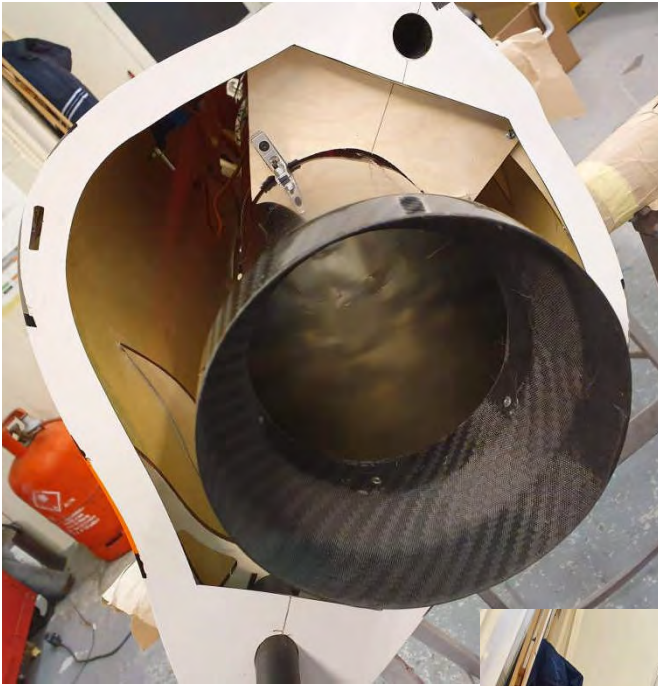


3.Engine and pipe installation

First you must start with installing the pipe to the rear of the fuselage.trial fit the rear former,this gets bolted to the rear former that is installed by the factory with x6,3mm bolts and claw nuts. you may have to make a slice on the bottom to squeeze it into the molding at the back of the plane.(For 3d modification please see vector option on page 15 before following these steps)After the test the pipe slides into the former it is now time to install the front former and brackets to fix the pipe to the fuselage.

Locate the pipe former shown in picture below.





This former also it bolted with x3 4mm bolts.and sits against the factory installed former and also slots over the joining tube mounting former's.

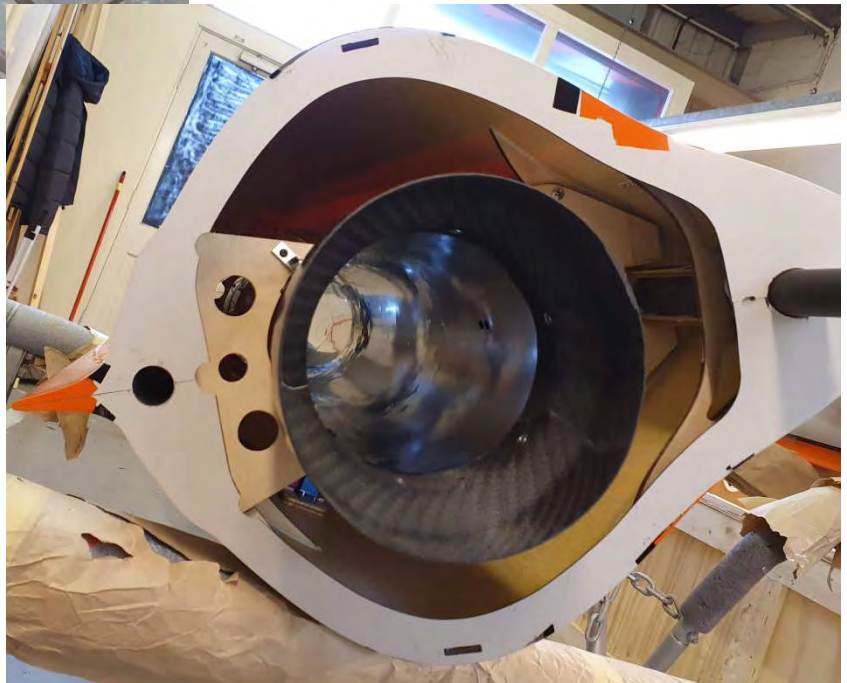
It is now a good Idea to test fit the engine and pipe alignment.so you can make some fine adjustments.

The pipe is held in by 2 metal L brackets.Drill and pop rivet to the pipe and bolt to the former with 3mm bolts and claw nuts.

The pipe distance at the back of the fuselage should be flush with the back.as seen on the picture on the right.

The engine and pipe distance is not easy but can be make a little simpler.

Use the fuselage fixing tabs as datum mark for your measurements.



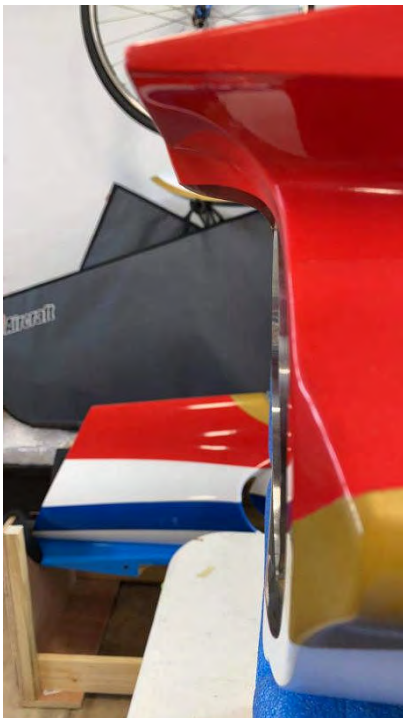
First measure from the middle of the hole of the tab to the front of the bell of the pipe.

Now you can slide a thin tube through the corresponding holes on the main fuselage side.now you can transfer this measurement to the engine mount.

It is now up to you to make the correct distance from the pipe.as this is different for every engine size.for example 200n/300n is a pipe distance of 35mm.

We have supplied you with two engine plates which can be modified for your engine.start by bolting these to the engine

mount former's first.when you can put the engine on top of that and drill your holes as needed to fix it.



(note some large engines many not have enough room for the fuel tank to fit and may need the pipe shorting up to 2 inch's.)

4. Fuselage Assembly

The two half's of the Fuselage are joined together using parts provided Two 4mm shanked bolts top and bottom, plus two 4mm countersunk in the sides please clean up any lose flashing on moulds before fitting.



Fuel tank and smoke tank

If you are using a turbine with 220 N or higher , the recommended fuel tank from Krill is ideal. The main tank former is already the correct shape for the fuel and smoke tank to be bolted to the it. Slide the former into the fuselage from the front hatch opening. Now bolt the fuel and smoke tank in with two 4mm bolts.with the engine installed you can check to see if you have enough room for the engine behind the tank with a 5mm gap.see pictures below.



When you are happy that the pipe distance from the engine is correct, and there is a 5mm gap between the engine and tank, you can now tack glue the former in with thin zap cyno. take out the tanks and now glue the former with epoxy or hysol. (extra fixings seen in pictures are mainly for 3d flying and not mandatory for a standard version.)

5. Tail stab Assembly



First find the two half's of the tail tubes.

Push both sides into the fuselage and screw the M4 bolt from the pre installed tube guide at the back of the plane. There is also a pre installed claw nut in the former so that you can tighten it up without any chance of stripping the thread.

Now test fit then two tail half's into the tubes and the front pegs into the holes.

When you are happy you can now glue the tubes into the tail half's while the tubes are fixed in the fuselage.

This is no problem as long as you apply Epoxy or Hysol glue to the tail outer tubes (not to the carbon tubes)

Leave to dry then unscrew the M4 bolt to allow the tail half's to slide out.

Install your servos facing away from the elevators. this will give you enough room for a rod that is not too short.

Use a 30mm long metal horn on your servo.



The Gabriel horns should be set so the ball joint center is directly above the elevator hinge line. It works out about 15mm back from the tail skin when the elevator is in the neutral position.

Now make up a rod that is 115mm long.



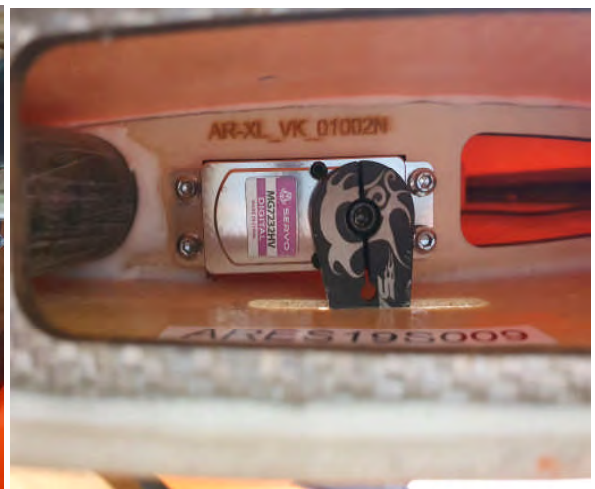
6. Rudder Assembly

Rudder hinges are factory finished and require no attention but it is good practice to check glue joints and movement. First install the servo into the servo mount of the Fin, using a metal servo horn 30mm long. Carefully cut the slot in the Fin so that it is 90 degrees to the horn in Rudder. Drill holes marked on rudder and glue horn in place with 30 min epoxy. Check moment and there is no binding. The black Gabriel horns should be positioned the same place as all the other surfaces.

Make up the rod which is 140mm from ball to ball centers.



Secure the Fin with two 4mm countersunk bolts .

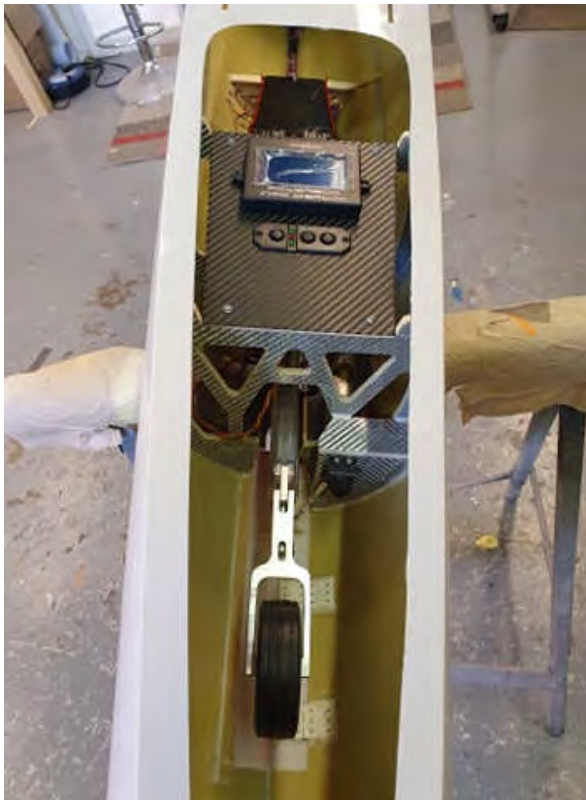
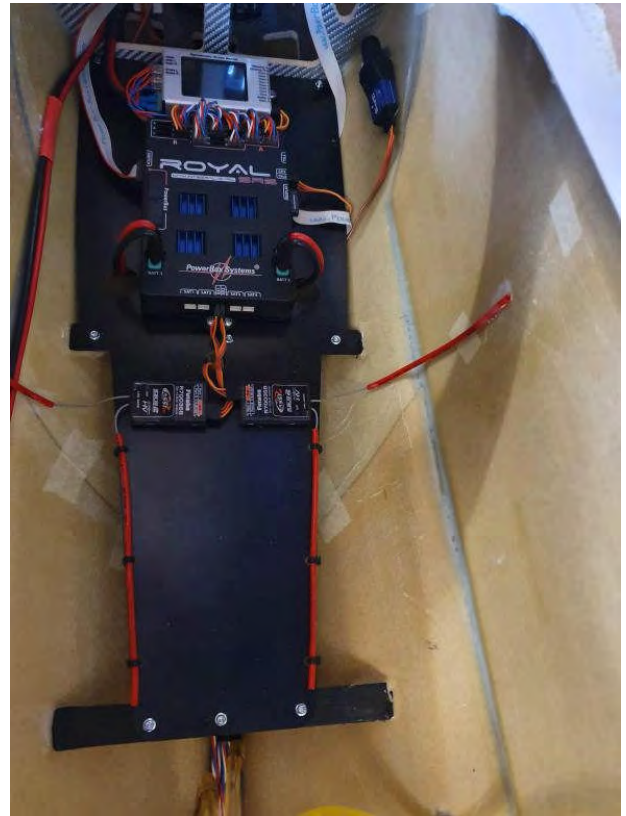


7. Radio Installation

There are many ways to install a jet turbine. But the most important thing is the fuel lines before the pump are as short as possible. Also depending on the c of g. With these factors taken into account, here are some ideas of installation. we recommend leaving the battery install till the very end when you are setting up the c of g.

Note these pictures are for a 3d setup and a Jetcat P300 Pro . They are only guidelines and may change with different radio and turbines.but one thing you need to keep in mind is to keep the radio quite far forward if your engine over 200n.as the weight off the engine makes a fairly big difference





(Always use high quality extension leads to handle any power loss in the long wire)

Route cables round the back through the internal formers and down into the nice long groove and the bottom of the fuselage. Hold in place with cable tie.

You can also sleeve with heat resistant lagging if you want to. For the best protection, you can use 1/16 balsa sheet on the bottom of the fuselage to completely seal the wires on the bottom. After making sure all wires are as far away from the pipe as possible you can screw the pipe in.

Fuselage joining leads.

Here is a picture of how to mount the leads as far away from the pipe as possible. make the fixed end of the lead, in the front part of the plane.

Now try and keep the leads length to a minimum in the tail side so that you don't get it bunched up and can get close to the very hot pipe.



8. Mods, extras and 3d setup

The Vectored thrust add-on are also an option when ordering your ARES from krill Models.

(Installing the thrust pipe for vectored thrust is quite simple but you must take care with aligning the two pivots 90 degrees to the plane).

First bolt the vector mount to the rear former with four 3mm bolts and claw nuts. making sure that it is exactly in the middle of the former ring. Also make 90 degree marks for reference when you are bolting in the former.



Remove the vector unit and now you can install the former ring with six 3mm bolts.using the 90 degree marks,make sure that it is exactly vertical and horizontal to the wings and fin.

Now you can once more bolt in then vector Assembly.

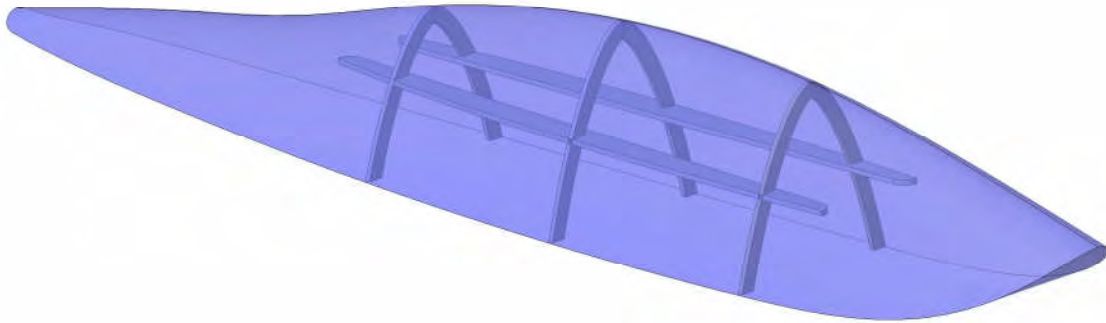
Now when you install the thrust pipe you can push it inside the vector unit leaving a 2mm gap from the vector unit and outer wall off the pipe.



Canopy hatch reinforcement

The Ares design features and very large canopy which is great for knife edge flight.how ever this requires some former's to make it strong enough for the forces in the air.see pictures below how to

do this. these parts are supplied in the kit. simply tack in place with a small amount of CA then epoxy or hysol the complete area.



3D vector thrust pipe servo and push rod install.

To get best results from gyro assessed vectored thrust it is very important to have high speed and high power servos. As the gyro often can try and work quicker than the servo can operate. This causes delay and catch up with the servo. This can result in the gyro not working properly or possibly uncontrollable!!



The recommended servo ultra high speed digital servo such as **JR ds8915**

The great thing about the ARES 3d setup, is that you can remove the thrust pipe to work on the vector servos.so please do so, it is a lot easier!!

Here is an example from the prototype.

As you can see the vector servo mounts are epoxied to the side and bottom of the fuselage.also reinforced by adding carbon fibre cloth to the mounting area for extra strength.

Note the bottom rod is positioned so that it can move inside the molded fin in the bottom of the plane.with the servo horn pointing straight down.this gives you the best geometry to operate the elevator vector.

The rear mount is also marked where to remove material to accommodate the vector horns.you may require to take out a little more to get the range of movement required.no more than 40 degrees of movement in required to achieve a 3d/hovering flight.

Use carbon fiber push rods to keep the weight to a minimum.make sure you use thick walled carbon and no smaller than 5mm (outside diameter).

The length of the rods should not be to long to avoid bending.but you should also consider the weight that is being added at the back end.it could make the c of g difficult to achieve.Also that a vector system always wants to keep the rod tort as it gets pushed by the thrust at the tail cone.

If you are making your rods from scratch I would suggest you hysol a piece of 3mm threaded rod into the carbon at each end.make sure you slide at least 2 inches into the carbon.there are other systems that you can use but we have had 100% success with this method.

3D full length Aileron conversion.

This setup is ready for you to use straight from the factory.the design was intended for you to use the inboard and out board as Ailerons.

So to achieve this all you need to do different from page 3 is make all 3 servo setups exactly the same. Make sure the “flap” push rod length is the same as the two Ailerons. Then it is ready to go.

Powerbox iGyro 3d setup and gains.



When you are servo matching make sure all surfaces are servo matched to there high rate setting as the gyro will only travel as for as you have servo matched.

BEFORE SETTING UP GAINS YOU MUST ACTIVATE X4 GAIN IN YOUR POWERBOX.

function	flight mode 1 Vector NOT active	flight mode 2 Vector NOT active	<i>Heading hold Flight mode 2</i>	flight mode 3 Vector IS active	<i>Heading hold Flight mode 3</i>
Aileron A	0	10%	3	25%	5%
Aileron B	0	10%	3	25%	5%
Elevator A	0	10%	3	25%	5%
Elevator B vector	0	0%	0%	70%	5%
Rudder A	0	10%	0%	25%	0%
Rudder B vector	0	0%	0%	70%	3%

FLIGHT CHARACTORISTICS SHOULD BE SET ON NORMAL OR HARD FOR NORMAL FLIGHT.

FOR 3D FLIGHT SET CHARACTORISTICS ON TO ULTRA.

(PLEASE NOTE NOT EVERY PLANE IS THE SAME AND MAY REQUIRE SLIGHTLY DIFFETRENT SETTING.WE SUGGEST YOU START BY USING A REDUCTED PERCENTAGE OF GAIN FOR TESTING).

Movements

function	Low rate	High rate (3d vector)
Ailerons	30mm	60mm
Elevator	25mm	35mm
Rudder	45mm	45mm
Flaps	110mm	-----

Vector movement does not need to exceed 40 degrees!!

Flap mixing

The Ares requires 10mm of down elevator with 110mm of full flap.

No knife edge mixing required

Recommended cg:

The recommended centre of gravity location at the rear of the tube.(note because of fuel tank position, the c of g changes throughout the flight.

(This setup will mean the model will stay on its tail when pushed down fully without the canopy on.but will remain on three wheels if it is not moved. This is not a problem as the wheel placement is designed for a smooth take-off!!)

Range test and your radio before you fly or start up engine, make sure you perform a full rang check instructed by your radio systems manual.

Double check controls and gyro are the correct direction and defection.

Make sure all batteries are charged!!

FINALLY HAVE A GREAT TIME FLYING YOUR NEW Ares S!!
THE ULTIMATE 3D & JET TRAINER!!

Ares S Designed by Sebastiano Silvestri

Manufactured by Krill Models.

Instruction manual written by Matt bishop of Bishop Aviation

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