

### ZEFIRO SPORT JET ASSEMBLY MANUAL

### **Specifications:**

Type: Airex Carbon Fiberglass Composite Length: 113" (2880mm) Wing Span: 113" (2880mm) Weight : 35—44Lbs ( 16—19 Kg) Engine : 31—44 Lbs (14—20 Kg) trust

Thank you very much for purchasing our Zefiro Sport Jet. Please note that the photos in this instruction manual

are from the latest development of the kit (pictures made in 2022).

Zefiro is the result of many hours of flights and structural tests carried out by our test pilots, the "Biella Jet Team".

This manual describes the assembling of the model.

Before you start building and setting-up your aircraft, please make sure you have read and understood this instruction manual, if you have any questions, please do not hesitate to contact us.

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# **INTRODUCTION**

Thank you for purchasing Arolab Zefiro Sport Jet. We have put a lot of effort and time in order to develop this model. We at Arolab Model Design do our best in order to provide to all our clients worldwide very high quality models.

Although we have made every effort in order to make this model fit for shipping, we would like you to inspect the contents and call your nearest dealer immediately if any defects or missing parts are spotted!

# LIABILITY

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 AROLAB Model Design 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 Arolab Model Design 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 Arolab Model Design 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 Arolab Model Design 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 judgment in acquiring and operating this model.

## WARNING

This 'jet' aircraft is a high-end product and can create risks for both pilot and spectators, if not handled with care, and used according to the instructions. Make sure that you properly operate your jet

according to the local rules, or those laws and regulations governing model flying in the country of use.

The engine, landing gear, servos, linkages and control surfaces have to be connected properly. Please

use only the good quality servos and accessories.

Make sure that the 'Centre of Gravity' (COG) is located in the recommended place. Use the nose heavy end of the CG range for your first flights. A tail-heavy plane can be an enormous danger for you and all spectators.

Fix any weights, and heavy items like batteries, securely into the plane.

Make sure the plane is secured properly when you start the engine.

Have a helper hold your plane from the nose before you start the engine.

Make sure that all spectators are far behind, or far in front, of the aircraft when running up the engine.

Make sure you have a CO2 extinguisher next to you.

Make sure about your range check on your R/C system before the first flight. It is necessary to perform range check WITHOUT the engine running. By pressing the range test button on the TX check the distance you can walk before 'fail-safe' occurs.

Then start the engine, run at about half throttle and repeat this range check.

Make sure that there is no range reduction before 'fail-safe' occurs.

If the range with engine running is less then with the engine off, please DON'T FLY at that time. Check that the wing, stab, fin and nose retaining bolts are tight.

Please do not 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.

### **ARF** Paint

The base finishing on your Zefiro Sport Jet model was applied in the mould, whether the second colour if chosen, is applied out of the mould.

We use only the highest standard two-component epoxy paints to finish your model. Do not leave your model unprotected in the sun! Always cover your model or park it in the shade. Extreme temperatures may damage the paint.

The Decals (Arolab scheme) are made of vinyl and are already applied at the factory

### **HANDLING & TRANSPORT**

Take care when handling your model. DO NOT PICK UP AN FULLY FUELED MODEL BY THE LEADING EDGE BY YOURSELF! Always ask for some help in order to safely move your plane. Inspect your model before and after a rough landing.

Make sure all parts are safe and sound.

Inspect model before and after transport.

A sudden stop can easily cause an unnoticed dent!

The wings and tails are very flight worthy structures. They are light and extremely strong however, they will dent if mishandled. Always support these structures well protected.

#### **Necessary Tools and Adhesives:**

This is a fairly quick and easy plane to build, for a jet model, not requiring difficult techniques or special equipment, but even the building of Arolab aircraft requires some suitable tools! You probably have these tools in your workshop anyway, but if not, they are available in all good hobby shops, or hardware stores:

- 1. Sharp knife
- 2. Allen key set (metric)
- 3. Sharp scissors
- 4. Pliers
- 5. Wrenches
- 6. Slotted and Phillips screwdrivers
- 7. Drills of various sizes
- 8. Battery drill and Dremel tool (or similar) with cutting discs, sanding tools and mills
- 9. Sandpaper (various grits), and/or sanding tools
- 10. Carpet, bubble wrap or soft cloth to cover your work bench (most important!)
- 11. Car wax polish
- 12. Paper masking tape
- 13. Denaturised alcohol, Acetone

#### Adhesives:

Not all types of glues are suitable with composite parts.

Here is a selection of what we normally use, and what we can truly recommend. Please do not use inferior quality glues - you will end up with an inferior quality plane that is not so strong or safe. Jet models require good gluing techniques, due to the higher-flying speeds, and hence higher loads on many of the joints. We highly recommend that you use a slow cured epoxy (30min.) for gluing highly stressed joints and control horns, into position.

#### **Radio equipment**

Failure to use the recommended servos, output arms, extensions, and hardware may result in a loss of control!

The trend nowadays is to use dual battery management systems as normal for a jet model. Always centre and install the correct output arms while on the bench, once the servo is in the aircraft access to the

servo arm screw is sometimes limited.

REMEMBER: Do not save any money when buying radio equipment. Good quality servos are recommended.

Required servos:

In our prototypes we used digital servos operating at 7,4 volts with torque of 20/25 kg.

- 1 for the Rudder
- 2 for the elevators
- 2 for the ailerons
- 2 for the flaps
- 1 for nose steering wheel

Turbine engine, with thrust range between 14kg and 20kg, One of the common choices is the JetMunt M166TS, More than plenty in order to have excellent performances.

10. Fuel tubing, Hopper tank (UAT), Festo fittings, fuel filters, fuel tube clamps etc.

11. Cable ties in various lengths. Cable management parts, Aluminium tape, safety clips etc.

### Everything clear up to here?

### If is all clear, you can start assembling your Zefiro Sport Jet If not... read it again before you begin the assembly.

### Zefiro Sport Jet Kit Contents:

1. Right wing Include flap + aileron already pre hinged (elastoflap)

- 2. Left wing Include flap + aileron already pre hinged (elastoflap)
- 3. Elevator, rudder and wings aluminium spars
- 4. Fuselage front
- 5. Fuselage rear
- 6. Fin + Rudder already pre hinged (elastoflap)
- 7. Stabilizer L + R incl elevators already pre hinged (elastoflap)
- 8. Aluminium main spar
- 9. Canopy
- 10. Exhaust stainless steel tail pipe (if purchased with the kit)
- 11. Main fuel tank (4liters)
- 12. Set of JP landing gear legs weels brakes and controller (if purchased with the kit)
- 13. Set of control horns
- 14. UAT (if purchased with the kit)
- 15. Decals (if not already applied at factory)







### **CONTROL LINKAGES** To be made with a threaded bar size 3 mm included in the kit

## WINGS

**NOTE:** Make sure to have some sort of protective foam on the workbench. This will protect the paint surface from unwanted dents. Assemble both wings simultaneously. Mark  $\sqrt{\text{each step.}}$ 

Remove and mark servo covers, inspect plywood and make sure servos fit well.

- Aileron servo should be mounted with horns facing outwards
- EL Secure servo horn and centre servo with TX.
- **⊇** Secure extension wire. Use safety clips on joint.
- EH Fit servo to wing.
- н Fit pushrod use Uniball links.
- → Mask servo cover and draw location of servo horn.
- EH Cut slots in servo cover.
- ₽ When happy with fit, secure servo cover.
- **EXAMPLE** Secure servo horn to flap servo and set travel with TX.
- **EH** Secure pushrod to servo horn with a Clevis M3.
- Hark location for flap horn on leading edge of flap. (Note: Make sure flap can travel at least 45 degrees down and fully neutral)
- **⊒** Glue the 2 horns into leading edge of flap.
- **When cured check operation of flap.**
- **⊒** Secure pushrod to flap using a 3mm uniball
- Repeat what above for other wing.

Trial fit wings to fuselage and mark location of hole for servo wires on fuselage.

**∟** Cut hole in fuselage for servo wires (we suggest to use 2 MPX connectors for flap ail. L/G and brakes).



₽₽ Fit the left/right main landing gear in the gear well and secure them with 4 wooden screw each.

Pass the wires through the wing joining the 2 other wires coming from aileron and flap. Use MPX connectors L/G and brakes





# **STABILIZERS/ ELEVATORS**

**NOTE:** Make sure to have some sort of protective foam on the workbench. This will protect the paint surface from unwanted dents. Mark  $\sqrt{}$  each step.

Fit servos trough the opening and adjust the horn travel using your TX.

**∠** Mark location of servo horn exit on bottom skin of stab.

**Cut slot for elevator horn (should be pre marked for standard size servos).** 

Bolt elevator servo to mount.

₽µ Make 2 identical elevator pushrods with the 3mm treaded bar. Use Uniball at the elevator ends.

Fit pushrods to servo horn.

EL Glue horns with epoxy in the slots.

₽ Fit pushrod and check operation of elevator.

**Repeat for other elevator.** 



NOTE : Make sure no wires can touch tailpipe. Touching tailpipe will melt wires and create short circuit. This will lead to crash.

**⊇** Open the rectangular slot on each side of the elevators mounts on the rear section of the fuselage, trial fit the elevators.



To glue in the right position the elevators bracket in the fuselage, drill a M4 hole in correspondence of the plywood reinforcement inside the stabilizers, insert the fiberglass bracket (which is pre threaded) and lock it temporarily in position with the M4 screw provided.

**H** When ok with the fitting glue with epoxy resin the part of the bracket ending in the fuselage.



**∠** Once the glue has cured, unscrew the M4 screw from the removable stabilizers, the Fiberglas bracket <u>must remain well glued in the fuselage part</u>.

## RUDDER

₽ Make pushrod with the 3mm treaded bar. Use Uniball link

Fit servos trough the opening and adjust the horn travel using your TX

ELL Cut slot for servo horn in skin. (Should be pre marked for standard size servos).

**Fit servo to mount.** 

**EH** Fit the pushrod to horn. Mark location of rudder horn.

**EH** Note travel of rudder to clear horn. Glue horns with epoxy in the slots.

Fit pushrod, Secure extension lead, Check operation of rudder.

Run wire clear of pipe.



Den the rectangular slot on the top part of the rudder mount, trial fit the rudder.



To glue in the right position the rudder bracket in the fuselage, drill a M4 hole in correspondence of the plywood reinforcement inside the fin, insert the fiberglass bracket (which is pre threaded) and lock temporarily in position with the M4 screw provided.



**H** When ok with the fitting glue with epoxy resin the part of the bracket ending in the fuselage.



**∟** Once the glue has cured, unscrew the M4 screw from the removable rudder, the Fiberglas bracket must remain well glued in the fuselage part.

# **REAR FUSELAGE & TAILPIPE**

#### Your Zefiro has a removable tail section to ease transportation.

Install extension wires for 3 servos in the tail. Make sure wires do not touch the tailpipe.

Use some ties to keep them attached to the bottom/side of the fuselage clear of pipe.

We suggest to pass the 3 wire in a fire proof sheath, the area is fresh enough but just in case...

We suggest MPX connectors where the fuselage split.

Fit 2 MPX support brackets in the front former then click in the 2 MPX connector coming from the tail.



El Slide in the exhaust pipe pre mounted with the main cone, make sure that the external layer of the pipe protrude from the exhaust for about 1 cm.



Becure the tailpipe with L shape aluminium profiles on the former, you can use rivets on the tail

pipe to connect the L profile with the pipe and a M3 metal screw with bolts to connect the L on to the plywood former.

# **FRONT FUSELAGE**

**⊒** Install the servo in the front landing gear, and connect the servo with the steering, then fit it in the nose mounting, secure it with 4 M4 wooden screw.



### FUEL TANK

Your Zefiro Jet is equipped with a high quality 4 litres fuel tank produced by Osvy Model in Italy.

Rinse the fuel tank with kerosene or diesel

Prepare a fuel line clunk, make sure you place a rigid tube between the plug and the clunk. Make sure clunk moves freely reaching all corners of the tank.

Fit to tank. Mark pipes for "inlet" and "outlet".

Fill tanks and check for any eventual leaks.

**⊒** Drain tanks with fuel pump and check no air bubbles in system until last drop is drained. A good plumbing will secure good turbine operation.

Cur already flying Zefiros, are all equipped with a 250cc UAT, as well produced by Osvy Models, We strongly recommend to install a suitable UAT after the main tank.

NOTE: You can also install a smoke system, your Zefiro is already equipped with a dedicated location on top of the main fuel tank.

On this flat plywood board you can install a 1,5 - 2 litre smoke tank and its pump, separate plumbing is required, we suggest the Powerbox smokepump.







# **TURBINE INSTALLATION**

Please follow the instructions supplied by the constructor of your turbine.

Before gluing in position the turbine hard-wood mounts, pre install the engine in order to calculate the right distance between the nozzle of the engine and the intake of the tail pipe (always follow the engine manufacturer indications)

Conce determined the distance, drill in the wooden mounts the holes to secure the engine

ELE Glue in position the engine mounts by sliding them into the factory glued former, once the glue has cured you can install the engine

Place the turbine on the wooden mounts previously glued and use 4 metal screw with bolts to fix it permanently.

Run all turbine wires and power cables away from servo wires.

Always secure all wires in harness. I would suggest you install a FOD cover on the intake of your engine. This will protect your engine from Foreign Objects Debris while running.

Install fuel pump close to UAT. We recommend installing a Festo shut off valve after the pump.

EL Secure all Festo pipes lines with cable ties.

Install turbine Li Po battery according with the desired C.O.G.





# CANOPY



With canopy in place, from the rear opening, drill 2 holes with the size of the 2 tubes included.

Glue with epoxy resin the 2 pins in the canopy, these will allow you to block the canopy in position.

**The latching system can be done in different ways according to your preferences (here in the pictures you see a bolt through system with an Allen screw)** 

Glue with epoxy resin a small piece of plywood 3-4 mm thick under the front part of the fuselage, just above the front landing gear, subsequently with the canopy on, drill a hole M4,5 or M5 through the plywood previously glued. Then install a claw nut with the same measurement of the bolt you intend to use. We suggest to add a washer in between the inner lip of the black canopy and the bolt.

## JOINING FRONT AND AFT FUSELAGE

To join the 2 parts insert 6 Allen screw provided, in the 6 aluminium sleeves located on the lip of the front part, (this will ease tighten them once the aft part is connected) Connect the two wires (3 tail servos) coming from the back part to the relative MPX connectors. With a long Allen Key size 4mm tight each screw, this operation can be easily be made by passing from the canopy opening.

What above can be done at any time you need to transport your Zefiro to the airfield, or for storage purpose.

## **EQUIPMENT INSTALLATION**

**You can, at your discretion, cover with some vinyl the 2 main plates.** 

In this case, you see them covered with some carbon look alike vinyl.

Equipment installation is a personal venture. There is one golden rule: Do it as neat and logical as possible!

This will make fault-finding and service of components easier.

The Jet basically consist of 6 circuits:

- 1. Servo wires
- 2. Power cables
- 3. Fuel pipes / smoke lines
- 5. RX cable / Satellite Receivers
- 6. Landing gear / brakes

Keep these circuits as separate as possible.

It is advisable not to run RX cables (rx satellites) near any kind of electrical fields. Make all switches, filling valves, and charging sockets easy and accessible.

The accessory trays are huge and easy accessible. This will make it very easy to install all accessories.



# **BEFORE YOU FLY**

It is assumed that the builder of this kit has acquired the basic skills and knowledge

#### necessary to make a safe and functional radio control installation into a model.

NOTE: Make sure flaps travel with the same excursion. Flaps can be deployed in landing circuit and slow flying

COG	310mm-320mm from leading edge at root. Empty tanks,
	UAT full and L.G. down.

The CG can be changed according to your style A forward position is safe in a slightly nose heavy configuration. WARNING: Do not move CG back unless you have enough experience with this model.

WEIGHT	Weight Dry weight will be between 16 and 18 kg
POWER	Make use of battery management system. Double batteries for the avionics typically 2 x 2600 mah. In addition, make sure all wire can carry current needed to operate the system.
	Do a complete range check before fly Do this with turbine

TX RX running. Follow manufacturer's instructions.





# SERVO TRAVEL ADJUSTMENTS

Ailerons.....22mm up-down

Flaps.....110mm

Elevators...30mm up 25mm down

Rudder.....45mm each side

# THE MAIDEN FLIGHT

#### Take-Off

Do some taxi tests before your flight, Make sure you are familiar with all settings and make sure the model track straight on the ground without rudder input. Choose a fine day for the maiden flight.

Select take off flap and open throttle. Gently pull back on stick until the nose lift, maintain the same attitude until safe to make the first turn.

Raise the flaps, gear at safe altitude, and enjoy your firs flight.

#### **Slow Flight**

Most of the first flight should be used to get familiar with the slow speed flight characteristics. Select the flaps to the take-off position; there should be no pitch change. If any change of attitude occur when deploying the flap, just mix 1mm down elevator with flaps Extend the gear and select full landing flaps; adjust the power to maintain level flight and a speed of about 40 to 50 km/h

#### Landing

Fly a complete circuit before landing. Approach from the downwind side and lower the LG. Fly a complete circuit getting use to the power required. On the next circuit, lower the flaps. If you have, a headwind be very careful not to get below the power curve on the downwind side. Because of the size of the model, it might not be flying the speed you thought it might be flying.

Align the model and use throttle to control the descent, the elevators will stay very active even at low speed. Flare the model just before touch down. Let the model roll out

and apply brakes. Nose high landings are easy with a very effective stab.

Taxi back and do necessary adjustments to customize your Zefiro

#### We at Arolab Model Design, wish you many happy flights with your Zefiro!

