Jora Spol. s.r.o.

ULL production and purchase

Vraclav no. 5 Post code 535 42

Two-seat VLA designed by

Ing. Oldrich Olsansky, CSc.

Importer: Berglink Timbers (Pty) Ltd. t/a Helderberg Aviation.

FLIGHT, OPERATION AND MAINTENANCE MANUAL

VLA Aircraft types: Jora UA2

Flight, Operation and Maintenance manual for:

Aircraft Reg . . . . . .

Jora type UA2

Serial Number . . . . . .

This Flight Manual must be kept with the aircraft. Copies can be obtained on request.

CONTENTS:

NOTE: *The engine of this aircraft is not certified, and could fail at any time. For this reason NEVER fly over congested areas or other areas on to which a safe landing cannot be made in the event of an engine failure. On cross-country flights ALWAYS keep an emergency landing field in sight. Changes to the control system, structure, wings and engine are prohibited. All operating difficulties and equipment failures should be reported to the manufacturers.*

Introduction:

Welcome to the JORA family. We wish you many hours of pleasurable flying in this very enjoyable and undemanding aircraft. Please read this manual very carefully as it mostly refers to safety issues and your safety is of our utmost concern. The onus is on the owner of this aircraft to make sure that the PIC (pilot in command) has been properly converted by an authorized instructor. Also that he or she is fully compliant with all CAA criteria required to operate this aircraft. Changes and updates to the manual may take place in which case you will be informed and sent the updates to add to this manual. Please advise us if change of ownership takes place so that we may keep in touch with the new owner/s.

Technical description:

The JORA is a two seat VLA (Very Light Aircraft) with front mounted engine, upper placed wings and T-tail configured empionage. Seating arrangement is side by side with a central mounted control pole. The undercarriage consists of a stearable nose wheel built for resilience and the main undercarriage is made up of 400x100 wheels attached to a moulded, composite structure. The brakes are hydraulically operated disk type and applied by the brake lever attached to the control pole. Construction of the aircraft is a combination of laminate and wood. All wooden parts are fixed with Chs-Epoxy 371and coated with a layer of epoxy paint. Glass-laminate is from epoxy resin Chs-Epoxy 512 or L 285 with glass reinforced Vertex.

The wing is made up of two halves; both of the halves are connected to the center structure by bolts and are supported by Duralim struts. The front half of the wing is the bearing part (the D-Box), and is made up of a wooden main spar with a glass laminate cover over foam and spruce formers. The main spar is made up of laminated birch or beech wood. The ribs making up the back part of the wing are laminated from spruce. The whole wing is covered with fabric and painted with high quality UV resistant paint. The horizontal tail plane and the

flaperons are constructed in the same manner. The flap function is applied by a lever positioned at head height between pilot and passenger on the main bulkhead. All moving surfaces are hinged on 5mm bushed pins fixed into position with safety wire. (Checking on these forms part of preflight). The flaperon and elevator movement is activated by solid hinged tubes while the rudder is applied by a closed loop cable system.

Fuselage is an all-laminate structure formed around three bulkheads. The engine mount and front wheel leg are fastened to firewall made of plywood. The 60lt fuel tank is an integral part of the fuselage. The central super structure is made of steel tubing. The cabin is covered with transparent non-splintering material. Doors hinge upwards and are typically held by gas struts.

Power plants not exceeding 100hs and 90kg may be used Rotax 912, Rotax 582, Jabaru and HKS700e are some of the choices The most popular engine choice is the two-cylinder two-stroke Rotax 582 with mechanical gearbox. The propeller is chosen to suit the power plant but must ideally be ground adjustable VP. As mentioned the control stick is situated centrally between the seats and rudder pedals on both sides of the cockpit for dual control.

In summery: Ing Orlansky and his team have used their years of experience and come up with a strong, light-weight aircraft which is constructed by craftsmen and has been copied by others for good reason. The wing structure has been tested to +19G without failure! Apart from the undercarriage, which was originally made up of steel tubes, there has been little change to the original design.

Design Specification:

Variant	UA2	UA2 'Special'
Wing Span	10.5	9.5 m
Fuselage Length	6.05	6.05 m
Total Height	2.05	2.05 m
Wing Area	11.4	10.2 m2
Aerofoil	UA2	UA2 (NASA)

Performance Specification:

Variant	UA2	UA2 'Special'
VNE	113 mph	125 mph
VNO	80 mph	85 mph
Stall 8' Flaps	38 mph	40 mph
Stall No Flaps	40 mph	44 mph
Max V @8' Flaps	68 mph	70 mph
Max V @16' Flaps	58 mph	60 mph
MTOW	475 kg	475 kg
Take Off 8' Flap	43 mph	50 mph
Take Off No Flap	50 mph	55 mph
Take Off Role (full Flaps)	60 m	60 m
Landing Role (full flaps)	80 m	80m

Operational Limitations:

FLIGHT OPERATION LIMITATIONS

- Non-aerobatic maneuvers permitted only.
- VFR Flight only.
- Stalls.
- Steep turns with bank angles not exceeding 60°

- Performance limitations (as listed above) must be observed at all times.
- It is the responsibility of the pilot to fly in conditions that are compatible with his or her ability.
- Maximum Crosswind Component 23 mph
- Minimum pilot's weight on the front seat 55 kg
- Maximum crew weight 180 kg
- MTOW 475 kg
- Empty plane weight (basic version) 235 kg
- Center of Gravity position from leading edge
  Front limit 360 mm
  Rear limit 520 mm
- Max. positive G + 4.0 G
  Max. negative G - 2.0 G
- The owner of this aircraft is responsible to ensure that the weight and balance sheet is updated if any changes to the aircraft are carried out that may effect the W&B.
- Only daylight flights VFR are allowed

POWER PLANT LIMITATION

- Maximum engine weight 90kg
- Maximum Engine output 100 hp
- For specific power plant limitations refer to documentation on engine type chosen for this aircraft.
- In the case of the Rotax 582 here is a summery of important points:
  - The R582 is a two-cylinder two stroke water-cooled engine.
  - The R582 is fitted in the inverted position.
  - Preflight inspections before EVERY flight are crucial. (Refer to the section on preflight inspections.)
  - Recommended fuel is unleaded 95 octane or lead replacement fuel. Avgas can also be used.
  - Recommended two stroke oil for operation in South Africa is Castrol Super Outboard Oil. Synthetic oils, semi-synthetic oils and low viscosity "racing" oils are not recommended.
  - Air filters should be washed using dish-washing liquid and warm water and oiled using air-filter oil. Use liquid air filter oil, do not use spray-on air filter oil. This procedure needs to be

repeated between 10 and 50 hours engine running intervals depending on conditions of use. Never over-oil the filter as this results in poor engine performance and low EGT temperatures.

- The best manner to measure the performance of your engine is by measuring running temperatures. Use good temperature monitoring equipment ideally measuring EGT's (Exhaust gas temperature). Remember that the pitch of the propeller chosen has a marked effect on EGT's.
- Use only recommended products on and in your engine.

Description of systems:

- Taxing the Jora: The rudder pedals are connected directly to the nose wheel so steering takes place in the conventional manner. When taxing hold the control stick between the neutral and back position to take the pressure off the nose wheel. When taxing with a crosswind always hold the upwind wing down by holding the control pole in that direction.
- Engine throttle levers are on the outward side of the seats. Moving the throttle forward increases the engine RPM.
- Brakes are controlled by the lever on the control stick.
- Flaperon mechanism is positioned between pilot and passenger at head height. Lowering the mechanism activates the flaperon. Normally 8' of flap (one notch) is required for take off and landing. Only use 16' of flap (two notches) when doing extremely short landings and takeoffs. Always make sure that the mechanism has 'clicked' into position.
- The trim wheel is located on the port side of the control stick.

Flight Performance:

- Please read and make sure you understand the Performance Specification and the Operational Limitations of this aircraft.
- Do not exceed the listed speeds in any circumstances.
- Always take off facing into wind.

- Study and become familiar with the term “Down wind Demon”. Being able to fly ‘low and slow’ in a forgiving aircraft like the Jora warrants a full understanding of the concept.
- Climb rates, fuel consumption and take off / landing roles depend largely on the power unit fitted, the altitude, nature of the runway in use, as well as the met conditions at the time of measurement. Configured correctly the Jora performs exceptionally well in all of these area’s.
- Stalls are docile and very predictable. Power on stalls require more rudder input because of the effect of prop-wash, but in both cases the aircraft remains predictable. We advise practicing stalls often.
- The Jora has very good gliding characteristics: UA2 1:12 – 1:15 and UA2’Sp” 1: 10 at +/- 65mph.
- The above listed performance specs were derived at 2000’ASL with a full fuel tank and with a pilot weighing 85kg. Cruise speeds vary with engine and propeller type. The choice of propeller type and pitch chosen has an effect on the economy of cruise. In the case of the Jora UA2 ‘Special’ we recommend an in flight variable pitch propeller to best utilize the wide speed range of the UA2 wing. Alternately the propeller and pitch chosen should suit the type of flying required of the aircraft i.e. slower cruise speed and short field operation versus faster cruise speeds and longer field operation. With a ground adjustable propeller such as supplied by ‘WoodComp’ s.r.o. (www.WOODCOMP.CZ) one can use ‘trial and error’ to find the ideal pitch. (for more advise or discussion on this topic please feel free to contact us)

Minimum required equipment:

- Four-point harness.
- Airspeed indicator 0-150 mph.
- Altimeter.
- Authority to fly certificate and weight & balance document.
- Pre flight checklist.
- Fuel gauge or fuel management system.
- EGT and coolant temperature gauge.

Inspection and maintenance:

***NB: THE POWER PLANT USED IN THIS AIRCRAFT MUST BE MAINTAINED IN STRICT ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. REFER TO THE ACCOMPANYING MANUFACTURERS MAINTENANCE MANUAL FOR DETAIL.**

PREFLIGHT INSPECTION

- Engine and cowling secure and undamaged.
- Check coolant level correct.
- Check oil levels.
- Propeller clean and undamaged, bolts secure.
- Front gear, tire pressure, tire condition and tire creep.
- Check tire/spat gap.
- Left main gear tire pressure (.18-.22Mpa) and condition.
- Left side wing, structure and covering.
- Left wing strut attachment secure.
- Left aileron, control linkage and hinge pins secure.
- Left flap, control linkage and hinges secure.
- Left side of the fuselage, undamaged
- Tail group secure, surfaces undamaged and hinge pins secure.
- Elevator hinges and control linkages secure (split pin).
- Rudder hinges and control cables secure.
- Repeat items for right side.
- Fuel filler cap secure.
- Windscreen clear and undamaged.
- ASI pitot tube unobstructed.
- Cockpit area inside and out, check controls full movement, free and correct action.
- Check instruments serviceable.
- Open fuel tank sump drain and check for contamination.

Servicing, maintenance and repair work on this class of aircraft can be performed by the pilot, however an Approved Person must sign off such work in the Engine and Airframe Logbook. Use only approved spare parts.

25hr or Bi-Annual inspection

This check is done in addition to the preflight checks:

Fuel system

- Check tank internally for cleanliness.
- Check fuel filter for cleanliness.
- Check all fuel lines for degradation.
- Check auxiliary fuel pump by switching on and listening for pumping action.

Airframe

- Check cowl fixing lugs for action.
- Check control stick for freedom without undue friction.
- Check flaperon movement for play and that the stoppers are still in position.
- By holding the elevator firmly in position check the pitch action for play.
- Check doors for security.
- Check brake pads, brake disks and brake action.
- Check all bolts lock nuts for rust and tightness. Replace any bolts showing signs of ware with only factory approved fasteners. 8. Lubricate the nose leg bushes with a grease gun one and two.
- Check all safety belts for damage and action.
- Change the fuel filter.
- Check wheel spats making sure the fasteners are tight and tire clearance.

Wing

- By flexing each wing up and down check if there is any movement in the strut bolts. In the event of there being movement contact your Approved Person so that he/she can make a further assessment.
- Check flaperon hinges for wear.
- 2. Check freedom of flaperon's.
- 3. Check flaperon locking pin mechanism for defects.

Tail Empennage

- Check rudder hinges for wear.
- Check elevator hinges for wear.

- Check elevator fix bolt for tightness.
- Check rudder cables for wear and damage.
- Check tailskid for damage and security.

Corrosion protection

It is advisable that all bolts, nuts are treated with an anti-corrosion spray oil at regular intervals.

100-Hour or Annual Inspection

In addition to the 25hr/bi-annual checks, the following inspections are mandatory:

The Annual inspection must be supervised or performed by an Approved Person in accordance with CAA regulations:

- Engine check in accordance with the manufacturer protocol.
- ALL fixing bolts and nuts must be check for torsion and defects. All rust damaged bolts and nuts must be replaced with factory approved replacements.
- Detailed inspection of all and any structural components including structural cage, struts and attachment points.
- Detailed inspection of all aircraft control surfaces, attachments, hinges and controls.
- Detailed inspection of engine mounting brackets, hoses, electrical wiring, engine probes and senders. Verify that all required engine maintenance tasks have been complied with and that the engine is performing to specifications.
- Detailed inspection of primary flight instrumentation and engine monitoring instrumentation. Verify that altimeter and airspeed indications and accuracy comply with regulations.
- Clean and lubricate all joints and hinges where required.
- Check all polycarbonate windscreens for cracks or defects.
- Check all rivets for defects or movement and replace where necessary.
- Check Epoxy airframe for damage and signs of stressing.
- Check undercarriage for signs of stressing.
- Check tires for wear and replace when necessary.

Emergency procedures:

- Engine failure
- During take off usable runway ahead – close throttle and proceed to land.
- After take off no usable runway – execute emergency landing procedures and land straight ahead or no more than 30’ to the left or right of center line.
- Intermediate altitudes after take-off. The Jora's climb rate typically exceeds its sink rate in a controlled glide. This allows turning back to the runway in many cases that would not be advisable in ordinary aircraft. It is vital that this procedure is practiced so the pilot is able to judge at what altitude a turn back for landing is possible. Note that height loss vs turn rate is approximately equal so the steepness of turns should be flown to give best possible intercept of a suitable landing spot.
- Higher altitudes – execute emergency landing procedures switch the ignition off and shut down fuel pump if active, apply flaps as required and set speed for best glide (65mph), tighten the seat belts, choose most suitable landing site and FLY THE AIRCRAFT.

<u>Vibrations: If abnormal vibrations occur on the aircraft:</u>

- Set the engine revs where the vibrations are the least and land as soon as possible.
- If the vibrations continue to increase then switch off the engine and carry out emergency landing procedures.

Normal operation:

- Perform preflight checks. Note: for detail on engine preflight checks refer to the manufacturers manual.
- Start and warm engine in accordance with manufacturer recommendation.
- Taxi no faster than 10mph
- In crosswinds taxi with upwind aileron up.
- Perform pre take off checks.

- To take off increase power gradually to reach full power in three seconds and rotate at 50 mph (no flap) and 45mph (8' flap). After take off lower the nose to accelerate to 65mph (one up) and 70mph (pilot and crew).
- At a safe height perform post take off checks and release the flaps. Best climb is achieved at air speeds between 65 and 75mph and will differ on engine type and propeller set up
- Always fly within the operating perimeters of the aircraft.
- Best approach speed for landing is between 60 and 65mph-no flap; or 55 and 60mph: one-notch flap. We recommend approaching at the faster speeds in turbulence.
- Aim to touch down at speeds in the region of 40-45mph.
- Inspect the aircraft for damage after hard landings. If in doubt contact the agent who will advise you further.

Other information:

- Never attempt to take off when the wings are wet.
- The operating ceiling of the aircraft will depend on the power plant used. In the case of the Rotax 582 the ceiling will be about 14000ft.
- The JORA is comfortable at a wide range of air speeds, performing well and very safely at the lower end and equally being very comfortable at the top end.
- Pay particular attention to making sure that the fuel you are using is not contaminated. Always strain the fuel through a fuel strainer.
- The JORA is light and easily moved by one person. Do this by pulling or pushing on the propeller. To turn the Jora lift the nose wheel by applying weight on the tailplane and swing the aircraft in the direction required.
- Any and all repairs or modifications involving structural airframe work must be carried out by or under the supervision of a recognized approved person (AP) in consultation with the aircraft manufacturer and/or the CAA.
- Non-structural airframe repairs or modifications, engine repairs or modifications, equipment and instrument installations may be subject to approval by the CAA and/or the aircraft manufacturer.

Please check with your Approved Person or relevant authority before proceeding.

- Gauge of the main gear is 1450 mm
- Pneumatic tire dimension:
- Main gear 16 x 4 (400 x 100)
  Nose wheel 12 x 4 (300 x 100)
- Pneumatic tire pressure 0.18 Mpa.
- Anchoring the Jora: In the case where strong winds are encountered always park the Jora facing into wind. Tether the aircraft over the bolts at the ends of the struts under the wings. Dependant on conditions one can also tether the nose gear. Use the harness to fix the control pole so that the moving surfaces are held fast.
- For longer periods of shut down refer to the engine manual for engine storage protocol. For long periods of shut down the fuel tank and fuel lines must be drained. To save the tires from damage the aircraft may be stored by placing wooden blocks under the composite undercarriage ends. Disconnect the battery.

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For more information on your JORA please contact Helderberg Aviation at 0825544119.

Notes: