AIRWORTHINESS APPROVAL NOTE NO: 25712

APPLICANT:	Aerobuild Limited		
AIRCRAFT TYPE:	Yak 52		
REGISTRATION NO:	G-BWVR	CONSTRUCTOR'S NO:	878202
OPERATOR:	Mr J Askew		
CERTIFICATE CATEGORY:	Permit to Fly		

To Approve the Yak 52 Registration G-BWVR, Serial No. 878202 for the issue of a Permit To Fly

1.0 Introduction

The YAK 52 is a two seat piston engined primary trainer aircraft which is a tandem cockpit variant of the single seat Yak 50 aeroplane. It was announced in 1978 as a replacement for the Yak 18 and made it's first flight less than a year after commencement of the design work. The Yak 52 is designed by the Russian company, Yakovlev, although all Yak 52 aeroplanes have been produced in Rumania under license. Manufacture of the aeroplane began in 1979 and the 1000th aeroplane was delivered in 1987.

The Yak 52 aeroplane is currently being manufactured again in Romania by Aerostar at Bacau. This example was completed in 1987, and was operated by DOSAAF until 31 Mar 91, when it had accumulated 479:15 hours flight time. It was overhauled by the Shakhty Russian State Factory on 24 Dec 91 and flown to the UK on the Lithuanian register as LY-AKQ.

The purpose of this AAN is to approve this Yak 52, Serial No. 878202 for the issue of a Permit to Fly.

2.0 Basis of Approval

This aeroplane is an example of the same type granted a Permit to fly by virtue of the issue of AAN 24089.

The basis of approval for this aeroplane is the extensive operating experience of the type as a basic training aeroplane for the Russian military (over 1000 examples of this type have been produced), together with an investigation of the design standard and operational aspects of the aeroplane.

3.0 Description

The Yak 52 is a single engined two seat (tandem configuration) low wing primary trainer aeroplane of nominally all-metal construction with full aerobatic capability.

The fuselage is of a conventional light alloy semi-monocoque construction with a cantilever light alloy tail structure. The wings are of a single spar all metal stressed skin construction with trailing edge split flaps. The control surfaces are fabric covered. There is a ground adjustable tab on each aileron and on the rudder and a controllable tab in the port elevator.

The landing gear is semi-retractable and is pneumatically operated. The nose gear retracts rearwards and the main gear forwards but all remain exposed against the undersurface of the aeroplane to offer greater safety in the event of a wheels up landing. Emergency operation of the landing gear is via an independent pneumatic system which is charged on the ground. The brakes system is also operated by the pneumatic system which operates at a pressure of 50 bars (720 psi).

The aeroplane is powered by a nine cylinder Vedeneyev M-14P air cooled radial engine of nominally 360 hp manufactured by Ivchenko. This engine has a fully inverted fuel and oil system. The propeller is a two blade variable pitch (type V-530TA-D35). Cowl flaps are fitted to assist in the warming up of the engine by selecting them closed. Once at running temperatures, they must be selected open. The controls are in the front cockpit which is the "command" cockpit.

The fuel system consists of two tanks in the wings, each of 60 litres capacity feeding a small collector tank in the fuselage. The engine draws it's fuel from the collector tank. There is a single on-off fuel cock in each cockpit. Engine priming is accomplished by a two position injector pump operated from the front cockpit. A fuel drain is provided under the aircraft centre section and drains from the collector tank.

The electrical system is supplied by a nominal 28 volt engine driven generator with an associated voltage regulator. The system is protected by a circuit breaker. Twin Hitachi batteries are installed in the port wing and there are two static inverters providing AC power for additional services.

4.0 Technical Investigation

This aeroplane has completed 695:30 hours and 1856 landings at the time of application (end August 1996). The generic design of this aeroplane is accepted on the basis that there have been over 1000 Yak 52 aeroplanes manufactured and by virtue of the fact that there is no evidence of an unsatisfactory safety record of the type.

The applicant submitted a aircraft data sheet (Specification) dated September 1993 generated by the aircraft manufacturer as part of the approval of the first aeroplane (See AAN 24089), which defines the basic physical characteristics of the aeroplane including basic equipment and airframe limitations. This specification is applicable to this aeroplane.

A number of modifications generated by the applicant to address CAA concerns regarding some specific design features have been incorporated in this aeroplane. These modifications have been previously approved, are applicable to this aeroplane and are considered acceptable:

Modification No.	Description
YAK/01/AEROBUILD	To disable the simulated failure switches (rear cockpit)
YAK/02/AEROBUILD	To disable the starter isolation switch (rear cockpit)
YAK/03/AEROBUILD	To disable the brake arming switch (rear cockpit)
YAK/04/AEROBUILD	To disable flap operation from rear cockpit
YAK/05/AEROBUILD	To disable undercarriage operation from rear cockpit
YAK/06/AEROBUILD	English Placards
YAK/07/AEROBUILD	Replacement batteries (CAA Minor Mod 9/217/9103AV)
YAK/09/AEROBUILD	Fitment of approved Baklan 5 Russian radio (Q01088)
YAK/10/AEROBUILD	UK standard altimeter (IFR46-20M)
YAK/13/AEROBUILD	Removal of training springs

The applicant has added placards and markings required by this AAN. This aspect has been reviewed by CAA as part of the inspection of the aeroplane and has found to be acceptable.

The Yak 52 has an "interim" design life of 1000 hours. The life can be extended to 5000 hours provided a number of modifications are installed on the aeroplane (endorsed by the aircraft designer Yakovlev) as defined by the following list of Manufacturers Modification Bulletins:

Modification Bulletin No.	Code	Description
152.2.0.0011.2	9DK	Reinforcement of Skin Fin
152.3.0016.1	18DA	Replacement of elevator counterweight bolts with rivets
152.5.0.0012.2	28DA	Modification of Elevator Counterweight Fastening
152.5.0.0027.2	37BD	Replacement of Aileron support item 522007-10-1/2
152.6.0.0037.2	59R	Reinforcement of Wing Junction
152.6.0.038.2	60R	Replacement of Fuselage Beam
152.7.0.0043.2	62DK	Improvement of Aileron counterweight fastening
152.7.0.0044.3	66R	Replacement of Joining Bolts on Frames 3 and 8
152.8.0.0060.3	70BU	Improvement of Rudder counterweight fastening
152.8.0.0061.3	75BU	Replacement of Aileron attachment (522007-10) to rib 7 and stiffening of rib 7 peak wall
152.9.0.0071.2	93BD	Modification of Elevator counterweight
152.1.0.0099.2	107BD	Fitting reinforcement strap for wing spar

It has not been shown that these modifications are incorporated on this aircraft G-BWVR. The aircraft log books therefore define a 1000 hour life for this aeroplane. If at a later date, the applicant demonstrates to the satisfaction of CAA that the modifications have been installed, this life can be revised to 5000 hours.

The applicant has presented a list of lifed items applicable to the aeroplane as generated by the aircraft manufacturer. These lives (as follows) must be incorporated in the maintenance schedule for the aeroplane.

Description	Part Number	Life Limit hrs/years
Propeller	V530TA-D35	500/6
Air Bottle	LM-375a-11-50	-/5
Air Bottle	LM-375a-3-50	-/5
Speed Indicator	US-450K	1000/5
Gyrohorizon Indicator	AGT-1K	500/6
G Meter	AM-9S	2000/5
Vacuum Pressure Gauge	MV-16K	1500/6
Cylindrical Thermometers	TTT-13	6000/5
Fuel Pressure Transducers	P-1B	1000/4
Oil Pressure Transducers	PM-15B	1000/4
Pressure Gauge	2M-80K	1000/4
Flexible pipes*	as fitted	600/5

*The flexible pipes have a total life of 10 years (shelf life + operating life) as defined in a service bulletin from the aircraft manufacturer.

The applicant provided a set of Pilot's Notes as part of the approval for the first aeroplane, compiled by himself and based upon a translation of the original Flight Manual supplied by the aircraft manufacturer. These notes have been amended to remove specific weight data allowing use on other aeroplanes and are now at Issue 3. These notes are considered acceptable for this aeroplane operating on a Permit to Fly.

5.0 Flight Test

The first aeroplane was the subject of a flight test by CAA. The performance and handling of the aeroplane was considered to be acceptable. Flight Test Report FTR 8838P refers.

This aeroplane has been flight tested by Mr M Jefferies to AFTS No.2 at issue 7 and was found to be satisfactory. The applicants flight test dated 22 November 1996 has been reviewed by CAA and is considered acceptable.

6.0 Weight and Balance

This aeroplane was weighed by the aeroplane manufacturer, and the weight and balance information is defined in a schedule prepared by Yak UK. A pro-forma of this schedule is included in the Pilot's Notes submitted by the applicant for this aeroplane (See Section 7 of this AAN).

7.0 Pilot's Notes and Placards

The applicant has prepared a set of Pilot's notes based on a translation of the original Flight Manual for the aeroplane as modified (Ref: Aerobuild Yakovlev Yak 52 Flight Manual AB/FA/52) which are considered acceptable. These Pilot's Notes are currently at Issue 3.

Later issues accepted by CAA are also considered appropriate provided the limitations as defined in this section of the AAN are not changed.

The following limitations shall apply:

Maximum Take-off Weight	1315 kg (2899 lbs)	
*Manoeuvre load limits	+7g/-5g	
Centre of Gravity Limitations	One Pilot	17.5%-27% MAC
	Two Pilots	23%-27% MAC

This corresponds to: 17.2cm -32.8cm forward of datum (One Pilot)
17.2cm -23.78 cm forward of datum (Two Pilots)

Where the datum is a point 61.5 cm aft of the leading edge of the wing 210.8cm from the centreline of the aircraft.

*Never Exceed Speed (V_{NE})	420 km/hr (226 knots)
*Maximum Manoeuvring Speed (V_A)	360 km/hr (162 knots)
*Maximum Speed Flaps Extended (V_{FE})	170 km/hr (91 knots)
Maximum Speed Gear Extended (V_{LE})	200 km/hr (108 knots)

Solo flight from front cockpit only

Aerobatics and spinning are permitted except as detailed below:

Aerobatics are prohibited
a) with Flaps and/or Landing gear extended
b) With a fuel load is 20 litres or less

Maximum permitted altitude 10,000 feet

Powerplant Limitations:

*Maximum RPM	100% (5 minutes max.)
Maximum Continuous RPM (See also Pilot's Notes)	82%

Those limitations above marked (*) must be indicated in both cockpits (where appropriate) by means of appropriate placards or instrument markings.

Additional placards stating the non certified nature of this aeroplane must be installed in both cockpits and defined on the Permit to Fly

8.0 Radio Equipment Fitted

The applicant has received Q approval (No. Q01088) for the Baklan 5 VHF equipment under Mod No. YAK/09/Aerobuild.

9.0 Maintenance

The applicant has elected to use the maintenance schedule as recommended by the aircraft manufacturer. This schedule is defined as Aerobuild Yak 52 Maintenance Schedule ref: YAK 52 at issue 1 dated 17th December 1993. This schedule must include the list of lifed items as specified in Section 4 of this AAN.

10.0 Approval

This Yak 52 Registration G-BWVR serial Number 878202 as modified in accordance with this AAN is approved for the issue of a Permit to Fly provided it is operated in accordance with the limitations and conditions as stated in the Permit to Fly and provided it is maintained in accordance with the Maintenance Schedule as specified in Section 9.0 of this AAN.

R J Hardy
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For the Civil Aviation Authority

Date 16 January 1997