STANDARD OPERATING PROCEDURE 01/2015

LGS (AIR) CELL

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INTRODUCTION

1. National Cadet Corps (NCC) Air Wing Flying Squadrons are equipped with Microlite aircraft for imparting flying training and instilling a sense of adventure amongst the Air Wing cadets. There are presently 45 Microlite aircraft in 50 Air Squadrons of NCC and 110 more Microlite aircraft are likely to be inducted into NCC in the near future. To enable effective utilization of these flying machines it is necessary to put in place a robust provisioning, procurement and equipment accounting system that would not only ensure timely availability of spares and high serviceability of aircraft but also enable proper accounting of the costly spares purchased/consumed.

AIM

2. The aim of this SOP is to lay down guidelines for the maintenance practices of Microlight aircraft in NCC (including Provisioning/Procurement of spares, their accounting & repairs), Hangarage, SAA, Parasails, conduct of TETTRA Courses for Tech personnel, .

PROVISIONING AND PROCUREMENT OF SPARES

3. JD Lgs (Air) at HQ DGNCC is responsible for Provisioning and Procurement of spares for the Microlite aircraft. Towards this end, the recurring requirement of spares, servicing kits, overhaul/servicing needs to be worked out keeping in view the following:

(a) Annual training task

(b) Present life of airframe/aero engine/component

(c) Lifing policy/servicing/overhaul periodicity specified in the relevant OEM manuals /Service Bulletins/Policy directives.

(d) Mandatory spares/changes recommended in the relevant servicing schedules/ manuals/policy directives.

(e) Last two years consumption data.

(f) Float of fast moving spares/servicing kits authorized to be held at various units wherever applicable.

4. In addition to the above, non-recurring requirements/arising at units due to unserviceabilities, defects etc would also need to be consolidated and procurement action initiated.

5. **Procurement of Spares.** In order to effectively utilize the collated data and to provision the recurring requirements, the procurement / servicing / repairs would be regulated on a Centralised Local Purchase basis. HQ DGNCC Lgs Dte is designated as the central LP agency for this purpose wherein One commissioned Officer from Lgs Air Cell would be detailed as the **Purchase Officer** for all such purchases and associated documentation / aspects. The particulars and specimen signatures of the designated Officer would be forwarded to CDA and all concerned.

(a) Requirement of spares giving Part No. (Indicating whether the part pertains to Airframe or Engine) will be projected by Units on Lgs Dte (Lgs Air Cell) at HQ DGNCC as per format attached as **Appendix `A'**. The demands

at each Air NCC Sqn would be serially numbered for proper linking and follow up.

(b) Lgs (Air) Cell at HQ DG NCC will check availability of stock of demanded item at their store and if available, issue the items directly to the demanding unit.

(c) Lgs (Air) Cell at HQ DG NCC will examine and compile non-recurring demands received from various Air NCC Sqns. Quotations from the OEM / supplier for items or / and services not in the annual price catalogue of the firm would be called for. The format for calling of quotations is attached as **Appendix `B'**. The price called for / submitted by the firm would be on F.O.R. basis for direct supply to the demanding unit and installation, in situ (if required). The quotations / price list would be called for only from the OEM or their authorized supplier on PAC basis. The list of these firms is given at **Appendix `C'**. In case of dealing with firms other than OEM / authorized supplier, quotations from at least three firms would be invited and only L-1 (lowest) would be accepted until valid reasons for accepting quotations other than L-1 are endorsed by the CFA. The procedure for recurring requirements worked out by Lgs (Air) would also be the same as for demands received from user units.

(d) Sanction of CFA would be obtained for the finalized price (including Taxes, Charges, installation, commissioning, etc., if any) from `**Angle of Necessity (AON)**'.

(e) HQ DG NCC (Lgs Dte) will allot funds for centralized local purchase / repairs under code head 1/544/01 **on earmarked basis** for Air assets.

(f) The Purchase Officer would, on the basis of total financial effect obtain CFA sanction and place Supply Order as per **Appendix `D'** and forward copy of the same to all concerned. Requisite funds would be earmarked for the Supply Order.

(g) On receipt of stores DGNCC Lgs Air Stores/ the consignee Air NCC Sqn will immediately issue `**Acceptance Certificate'** with RV No. to the Firm. A copy of the same would be faxed to Lgs (Air) Cell at HQ DG NCC followed by ink signed copy by Speed Post. In case installation / commissioning is mentioned in the Supply Order, the `Acceptance Certificate' would only be issued after satisfactory completion of installation / commissioning by the firm for claiming the payment as well as installation / commissioning charges, if any. Format for `Acceptance Certificate' is attached as **Appendix `E'**.

(h) The firm, after dispatch of item (with certification), will prepare the bill and submit along with a copy of the Purchase Order and requisite documents. The Purchase Officer will obtain **Formal Sanction from CFA** on the basis of **AON Sanction** and the **actual Bill Amount**. Thereafter, he will process the bill and submit to CDA Tigris Road.

(j) CDA Tigris Road after receipt of duly certified and countersigned bill (with requisite documents) will make payment directly to the firm.

Repair Of Microlites.

6. **At Site.** The following procedure is to be adopted for repairs at site:

(a) Units will project details of repairs / servicing required along with spares required giving Cat Part No. (Indicating whether the part pertains to Airframe or Engine) to Lgs Dte (Air Section) at HQ DG NCC. The format of Report is attached as **Appendix `F'**.

(b) Lgs (Air) Section at HQ DG NCC will examine the feasibility of repair / servicing within the expertise available at the unit. In case of the required facility / expertise not being available at unit level, would advise nature of defect to the firm. The firm would furnish quote for complete repairs (at site) inclusive of items required to be replaced.

(c) Sanction of CFA would be obtained for the finalized price (including Taxes, Charges, installation, commissioning, etc., if any) from `**Angle of Necessity (AON)**'.

(d) The Purchase Officer would, on the basis of total financial effect obtain CFA sanction and place Work / Repair Order as per **Appendix `D'** and forward copy of the same to all concerned. Requisite funds would be earmarked for the Work / Repair Order.

(e) The firm would carry out the repairs / servicing, certify the repairs having been carried out and offer the Microlite (after repair) for Ground and Air Test to the Commanding Officer of the user unit. If the user is satisfied (after the Air Test) then Certificate of fitness and acceptance **(Appendix `E')** is to be signed by the user unit and handover two copies to the firm's Technician. A copy of the same would be Faxed to Lgs (Air) Section at HQ DG NCC and an ink signed copy would also be sent by speed post to Lgs (Air) Section at HQ DG NCC.

(f) The firm will prepare the bill and submit along with a copy of the Repair Order and **Certificate of fitness and Acceptance** (received from the unit) to the Purchase Officer for claiming payment. The Purchase Officer will process the bill and submit along with requisite documents to CDA Tigris Road Delhi.

(g) CDA Tigris Road after receipt of duly certified and countersigned bill will make payment directly to the firm under intimation to Lgs (Air) Section at HQ DG NCC, and the recipient unit.

7. **At Repair Agency.** The following procedure is to be adopted for undertaking repairs at repair agency:

(a) Units will project details of repair / servicing required to Lgs Dte (Air Section) at HQ DG NCC clearly certifying that the nature of defect is such that repair at site is not feasible. The format of Report is attached as **Appendix `F'**.

(b) Lgs (Air) Section at HQ DG NCC will float RFQ to the concerned Firm for disassembly of the ML and transportation to their premises advising the nature of defect. The firm would furnish quote for disassembly and transportation clearly certifying that the repairs cannot be undertaken at site.

(c) Sanction of CFA would be obtained for disassembly and transportation of the Microlite from `**Angle of Necessity (AON)**'.

(d) The Purchase Officer would, on the basis of total financial effect place Order as per **Appendix `D'** and forward copy of the same to all concerned including NCC Liaison Cell.

(e) On receipt of the Microlite at the Firm's premises, a joint survey will be carried out by the NCC Liaison Cell, representatives from concerned unit and the Firm. The Firm will forward their quote to JD Lgs (Air) at HQ DG NCC covering repair work, transportation back to the unit and re assembly at the unit along with a copy of the survey report.

(f) Additional Sanction of CFA would be obtained for the repair work, transportation back to the unit and re assembly at the unit of the Microlite from `**Angle of Necessity (AON)**'. The Purchase Officer would, on the basis of total financial effect place Work / Repair Order as per **Appendix `D'** and forward copy of the same to all concerned including NCC Liaison Cell.

(g) On receipt of the Repair Order, the Firm will commence repair. All the unserviceable items replaced would be returned to the NCC Liaison Cell who

will ensure proper accounting of all such items. All these items will be returned to the Unit when the Microlite is dispatched back on completion of repair for further disposal.

(h) NCC Liaison Cell will monitor progress of repair on a daily basis and furnish report to HQ DG NCC. On completion of repair, Air Test will be carried out by the Firm. On completion of successful Air Test, joint acceptance is to be carried out by the NCC Liaison Cell, representatives from concerned unit and the Firm.

(j) The Microlite thereafter will be dismantled and transported back to the unit. On receipt at the unit, it will be reassembled by the representatives of the Firm and Air Tested by the CO of the unit in their presence. The CO will satisfy himself that the repairs have been carried out as per the Order and sign the Acceptance Certificate.

(k) Preparation of Bills by the Firm and payment bt CDA will be as per para 6 (e) and (f) above.

8. OEMs are to submit Annual Price List and particulars of their authorized signatory along with their specimen signatures to the Lgs (Air) Section at HQ DG NCC. The Purchase Officer would forward a copy of the same to CDA for their records. In case of non-availability / non-submission of Price List by any firm, the procedure for calling of quotations is to be resorted to.

9. All certificates / CRVs (certificate receipt vouchers) issued by the user / receiving unit are to be signed by the CO/Commissioned Officer only.

10. The Purchase Officer is to :-

(a) Place Supply / Repair / Work Order only for items / repairs / servicing on firm.

(b) Earmark funds for those purchases / Repairs / servicing.

(c) Obtain sanction of CFA.

(d) Progress Invoices for payment.

11. The procurement / repair of commonly available items / low value items / non-proprietary items viz. Batteries, Araldite, measuring cans, chamois leather, etc., are to be procured / repaired locally by respective Air NCC Sqns from the funds allotted to each Directorate under related code head so as to obviate the air assets being on ground / unserviceable for trivial items and avoidable procedural delays through central provisioning. The bills for these purchases would be cleared through respective CsDA. Similarly the requirement of items pertaining to other code heads would be procured under the respective code head from the funds allotted to the

state Dtes or a Statement of Case would be forwarded through concerned Dte to respective section at HQ DG NCC for consideration.

12. The duties and responsibility of all agencies are listed at **Appendix `G'**.

Equipment Accounting

13. **Receipt of Stores from OEM/Other Agencies.** Whenever an item is received at an Air Sqn from OEM/ Other agencies, the same is to be brought on charge by raising a CRV as per **Appendix 'H'** annotating all the relevant details. Each CRV will be allotted an EX/RV Number from the manifold maintained for the purpose. The numbering will start from 01 Apr and end on 31 Mar of each year (Financial year wise). EX/RV will be raised in six copies. The distribution will be as under:

(a) 1st copy: To be retained at Air Sqn for Ledger action.

(b) 2nd, 3rd and 4th copy: To be forwarded to the Firm with EX/RV/CRV No. The Firm will retain 2nd copy. The 3rd and 4th copies will be attached along with bills and other documents and forwarded to HQ DG NCC for payment action. On accordance of CFA sanction at HQ DG NCC, 3RD copy will be passed to CDA along with Bills for payment action. 4th copy will be retained at HQ DG NCC for record purpose.

(c) 5th copy: To be sent by the Air Sqn to DGNCC Lgs Air Stores for record/monitoring purpose.

(d) 6th copy: LAO Air Sqn copy.

14. The Ledger balance is to be updated before stacking/binning the item in store. The Ledger should indicate the location of the item in store for easy access and handling.

Transactions at Air Sqns

15. **Internal Issues.** Whenever a technician requires an item from store, a demand for the same is to be raised by the Inventory Holder of the Sqn, specifically detailed by the CO (Should be of the rank Sgt and above). The format of Demand is placed at **Appendix 'J'**.

16. Each demand is to be serially numbered during the Financial Year and raised in three copies. The third copy will be retained as the Pad copy.

17. First and Second copies are to be submitted to the Store Keeper who will annotate an IN/IV No.(Internal Issue Voucher) before issuing the demanded items to the Inventory Holder. The second copy will be returned along with the item. The Inventory Holder will annotate the IN/IV No. on the Pad copy of the voucher from the second copy for record purpose.

18**.** The Store Keeper will use the first copy to adjust the Ledger Balance and maintain it in a separate folder for records.

19. **Internal Returns.** Whenever an item becomes unserviceable, the inventory holder will prepare a Return Voucher as per format placed at **Appendix 'K'** annotating all relevant details.

20. The Return Voucher will be raised in three copies. The third copy will be retained as the Pad copy.

21. First and Second copies are to be submitted to the Store Keeper along with the unserviceable item who will annotate an IN/RV No.(Internal Return Voucher) from the Manifold maintained for the purpose. The numbering will start from 01 Apr and end on 31 Mar of each year (Financial year wise). The second copy will be returned to the Inventory Holder duly signed by the Store Keeper as having received the unserviceable item. Inventory Holder will annotate the IN/RV No. on the Pad copy of the voucher from the second copy for record purpose.

22**.** The Store Keeper will maintain a separate Ledger for record of unserviceable items. Items meant for DR/PWR**,** when returned as unserviceable will be accounted for as EACH as well WEIGHT. These items are repairable/valuable/attractive in nature and therefore need higher inventory control. All other items on return will be converted to their basic raw materials and accounted for only in weight. (For e.g. Metal Ferrous, Rubber, Leather etc.). He will use the first copy to update the Ledger Balance and maintain it in a separate folder for records. All items becoming unserviceable (other than consumables/expendables) are to be returned to store prior to issue of serviceable replacements. He will also ensure that the unserviceable items are kept in a separate store and not along with serviceable stock.

23**.** All unserviceable items accumulated at Air Sqns other than those on DR/PWR action will be dispatched to their respective Dte at least once in three months. Each Dte will send a quarterly return of the unserviceable/salvage stock held with them. Directorates are to conduct a BOO annually in the month of April for auctioning the items and deposit the proceeds in govt. treasury through an MRO. A copy of the board proceedings and MRO are to be sent to HQ DGNCC Lgs Air Cell for information. All unserviceable arising at Air Sqns on DR/PWR action will be dispatched to NCCLC as per SOP on DR/PWR.

24**.** The Store Keeper will make a list of salvage items before transfer to the Dte, obtain signature of the recipient and update his Ledger for salvage items accordingly. The list will be made in duplicate. One copy is to be retained by the Store Keeper and the second copy maintained at the concerned Dte.

MAINTENANCE ACTIVITIES

25. **Maintenance Support**

(a) **Zen Air**

(i) **Air Frame**. M/S Agni Aero Sports Adventure Academy (P) Ltd. (AASAA), Bangalore has been conferred the Letter of Authority by Zen Air Canada as their only authorised representative in India. PAC has been issued to M/s AASAA on 28 Apr 14.

(ii) **Engine.** M/S Varman Aviation Pvt. Ltd, Bangalore is the only authorised representative of BRP- Powertrain, Austria (the OEM of Rotax 912A Engines) in India. PAC has been issued to M/s VAPL on 31 Oct 13.

(b) **X- Air** M/S Raj Hamsa Ultralights Pvt. Ltd, Bangalore is the OEM. Maintenance support for Engine as well as Airframe is provided by them. The Firm has now been acquired by the proprietor of M/S AASAA and they will be responsible for all maintenance support on X-Air Microlights. PAC has been issued to M/s AASAA on 13 Aug 14.

26. All procurement of spares/ repairs is being made from the authorised representatives on Single Tender basis based on the Proprietary Certificate which is renewed every two years. Standard Operating procedure: 01/2012 is in vogue for maintenance of MLs.

Inspection Procedures and Periodicity

27. **Zen Air CH 701 Airframe.** As per OEM manual for STOL Zen Air CH 701, prescribed periodicity between two consecutive servicing (of similar types) is either 25 hrs or 100hrs only. An extract of the relevant pages of the manual is attached as **Appendix 'L'**. There would be three 25 hrs servicing between 0-100 AF hrs and the inspection carried out at 50 AF Hrs is nothing but a repeat 25 hrs servicing. There is no separate inspection/ servicing (200/400/600/1000/1500 hrs) required to be carried out on the Zen Air CH 701 aircraft and these are nothing but a repeat 100 hrs servicing.

28. The following items are to be inspected for their condition during every 25 & 100 hrs servicing and replaced wherever necessary:

(a) Bungee cord
(b) Fuel Filter

(c) Cushion Pad set.
(d) Nose Wheel Spacer
(e) Main Wheel Spacer
(f) Fuel Hose from filter to drain valve

29. The basic maintenance philosophy is to carry out preventive maintenance checks every 25 hrs and take corrective action based on condition. Items are to be changed 'On Condition' and not 'irrespective of Condition.' If it is subsequently felt that certain items need to be changed, based on either failure data or feedback from operating units, the same will be introduced as an 'Out of Phase Servicing' event rather than as a new servicing cycle. Such requirements would be communicated separately to all Air NCC Sqns by HQ DG NCC. Maintenance schedules for First and Second line servicing have been issued by CSDO, AF.

30. **Rotax 912A Engine.** In respect of Rotax engines, periodic inspections are to be performed at First 25 hrs followed by 50, 100, 200, 600hrs intervals in accordance with Chapter 05-20-00, Section 5.1 of Rotax 912 Maintenance manual of Oct 2009. An extract of the relevant pages of the manual is attached as **Appendix 'M'**. Maintenance schedules for First and Second line servicing have been issued by CSDO, AF.

31. **X-Air airframe.** In respect of the X-Air airframe, the servicing periodicities specified by OEM are every 50h/ 1 month, every 150h/ 6 months, every 300 h/1 year, every 600 h/ 2 years and every 900h/ 5 years. An extract of the relevant pages of the manual is attached as **Appendix 'N'**. Maintenance schedules for First and Second line servicing have been issued by CSDO, AF.

32. **Jabiru engines.** In respect of the Jabiru engines, the periodicity to be followed is initial 25 hrs check followed by every 50hrs, every 100 hrs and 200 hrs. The 200 hrs check is to be treated as a 100 hrs check with the addition of a fly wheel bolt check. An extract of the relevant pages of the manual is attached as **Appendix 'P'**. Maintenance schedules for First and Second line servicing have been issued by CSDO, AF.

33. **Defect Investigation procedures:** Despite an elaborate preventive maintenance program being followed, failures/ Defects do occur during the service life of a component leading to Unserviceabilities/premature withdrawal. In the interest aerospace safety and to improve the serviceability and reliability, it is necessary that any such defect is immediately reported on appropriate for, investigated and prompt remedial measures instituted to prevent recurrences. This is particularly important i.r.o component/ system failures leading to accidents and incidents. A detailed SOP on the reporting, investigation and subsequent monitoring of defects both i.r.o Airframe and Aero Engines systems is placed as **Appendix 'Q'**.

34. **TETTRA Training.** Technical Training on Zen Air ML for all Air Force Personnel (Officers and Airmen) posted to NCC Air Sqns is conducted at No. 2 Kar Air NCC (Tech) Sqn, Bengaluru. The course duration is one week. Three courses, each having 35 personnel, are conducted every year. Fund sanction for conduct of three TETTRA courses is obtained from MoD (GS VI) every year in the month of Apr. Charter of duties i.r.o CO, 2 Kar Air NCC (Tech) Sqn, Bengaluru is placed as **Appendix 'G'**.

35. **NCC Liaison Cell (Air)**. NCC liaison Cell has been formed at Bengaluru on Adhoc basis w.e.f 31 Mar 12, keeping in mind that both the OEMs of Microlights are located at Bengaluru. It has been created in line with existing Air Force liaison Units with PSUs such as HAL/BEL etc for ensuring better co-ordination, Tech practices monitoring, Quality control including defect investigation, incident /accident analysis (Tech issues) there by resulting in better serviceability state of Microlights Charter of duties i.r.o CO, NCC Liaison Cell (Air), Bengaluru is placed as **Appendix 'G'**.

36. **Hangarage** : Hangarage is a State subject and is to be dealt by concerned Dte/ Gp/Air Sqn NCC with appropriate authorities at AF/State/AAI. The NCC Air Sqns are operating from Air Force / State Govt /AAI hangars. Concerned Command HQs of IAF to be approached / liaised by the Dtes in case of any difficulty regarding hangarage and operations from AF Airfield. Similarly, appropriate authority at state/AAI to be liaised with regarding any hangarage issues in case of NCC MLs operations from state Govt /AAI controlled Air fields. Presently, NCC is not being charged towards hangarage for operating MLs from AF and State Govt controlled Air fields. However, AAI is being paid at the rate of 10% of market rates from NCC, w.e.f 01 June 2009 as agreed by AAI vide their letter No COM/NCC/Policy/13/1216(1-8)/1430(1-12) dated 21 Nov 13.

37. **Small Arms and Ammunition.** The provisioning of **Plastic Pigeon** and **12 Bore cartridges** for Air NCC Sqns is based on their projection called for annually (in the month of Feb). Demands as received from all Dtes is compiled at Lgs (AiR) cell,HQ DGNCC and the consolidated requirement is forwarded to "CASEO, HQ

Maintenance Command, IAF, Nagpur" for issue from concerned EDs/ASPs of the IAF. Both, **Plastic Pigeon** and **12 Bore cartridges are collected by the Dtes under intimation to this HQ.**

38. **Parasails**. The provisioning of `Parasail' is based on their holding / wastage / deficiency against the authorisation (six per Group) and is called for annually. The requirement is projected for approval in the Annual Provisioning Review (APR). Thereafter, the procurement is undertaken by the `Purchase Cell', of the Lgs Dte. Presently, all the Parasail held by NCC have lived their useful life and are obsolete. Qty 84 parasail are approved in 2013-14 and the same are under procurement by Purchase cell of this Dte. Earlier procured ex trade, these will now be procured from Ordnance Parachute Factory, Kanpur. An 'Annual Survey Board' is to be carried out as on 30 Apr every year, by each parasail holding unit and the completed BPs i.r.o all such units is to be forwarded by the Dte to this HQ by 31 May.

39. This SOP is applicable with immediate effect.

40. Any deviation to this procedure will be under the instructions of DDG (Lgs) only.

41. This has the approval of DG NCC.

Appendix `A'
(refers to para 5 (a) of SOP 01/2015)

FORMAT FOR DEMAND OF ITEM

Demand Control No: DCN-0001/2008/ML or GL/AOG or URGENT/1 (RAJ)/---- (date)

Sl No.	Part No.	Description	Denom of Qty	Qty Reqd	A/C No.	Airframe / Engine	Remarks (Justification / reason, etc)
PART A (ZEN – AIR MICROLITE)							
PART B (X – AIR MICROLITE)							

Note:

1. Separate form to be raised for AOG / Urgent demands.
2. All demands to be signed by CO.

Appendix `B'
(refers to para 5 (c) of SOP 01/2015)

FORMAT FOR CALLING OF QUOTATION

Telefax: 011- 2610 3976

HQ DG NCC
Ministry of Defence
West Block – IV
RK Puram
New Delhi – 110 066

17653/1/T/DGNCC/Lgs (Air) Jun15

M/S----------(Attn: Mr-------)

REQUEST FOR QUOTE:----------

Dear Sir,

1. No. 1 (TN) Chennai Air NCC Sqn requires items listed in the `Schedule of Requirenment' attached for their Microlite aircraft No.---------- make Zen-Air / X-Air.

2. A budgetary quote specifying all elements in terms of percentage as well as financial value individually and total (as per the format), if provided, would enable us to process the case in totality on a fast track.

3. It may be appreciated that NCC being under Government of India (MoD) has to abide to certaion laid down rules / procedures. Therefore, prior sanction of the Competent Financial Authority is required. The case can be processed only if all elements pertaining to the purchase e.g. warranty, lead time, price, taxes, other charges (if any), etc. are clearly spelt out rather than merely mentioning `Extra' or `As applicable'.

4. An early reply by return FAX would be highly appreciated.

Sd/-
JD Lgs (Air)
For DG NCC

Copy to:

1. Concerned demanding unit.

2. Concerned NCC Dte.

SCHEDULE OF REQUIREMENT FOR CALLING OF QUOTATION :

MICROLITE NO.---------- ZEN-AIR / X-AIR

No. 1 (TN) Air NCC Sqn : LTR REF 17653/1/T/DGNCC/Lgs (Air) 10 July 2008

Sl No	Part No.	Description	Quantity		Unit / Basic Price in Indian Rupees	ED	
			Denomination	Required		In %	In Rs.
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Sales Tax		VAT		SC/MST---		Any other Taxes		Any other charges (specify)		Total Amount In Indian Rupees
In %	In Rs.	In %	In Rs.	In %	In Rs.	In %	In Rs.	In %	In Rs.	
(j)	(k)	(i)	(m)	(n)	(o)	(p)	(q)	©	(s)	(t)

Note: 1. All Taxes/charges/levies like ED, ST, SC, CST should be mentioned in % as well as in Indian Rupees.

2. Total amount be mentioned in figures as well as words.
3. Delivery of items would at No.1 (TN) Air NCC Sqn, Chennai. Hence, quotation should on F.O.R. basis.
4. Charges for Installation / commissioning, if requested or opined by your firm (and accepted), be specified in the quotation.
5. No charges other than specifically mentioned in the quotation and accepted in the Supply Order would be admissible.
6. Lead time after placement of order ----------.

Signature of JD Lgs (Air)
HQ DG NCC

Signature of Authorised signatory of the firm
Stamp & Date

Stamp & Date

Appendix `C'
(refers to para 5 (c) of SOP 01/2015)

LIST OF AUTHORISED FIRMS FOR PROCUREMENT OFSPARES / REPAIRS : MICROLITES

Sl No.	Type of Microlite	Airframe / Engine & Type	Firm
1.	ZEN AIR	AIRFRAME	M/S AASAA (Agni Aero Sports Adventure Academy (P) Ltd., Hangar # 2, Jakkur Aerodrome, 12th KM, Bellary Road, BANGALORE-560 064 Tele: 080-28565574 080-28560060 FAX:080-28569152 e-mail:agniaviators@yahoo.com
2.	ZEN AIR	ENGINE (ROTAX 912A)	M/S VARMAN AVIATION PVT. LTD. Aviation Complex, 16-17, Road No. 7, EPIP White Field, Bangalore-560066 Tele:044-28412536 044-28412655 FAX:044-28413559 e-mail:varman@airtelmail.in
3.	X – AIR	AIRFRAME & ENGINE (JABIRU 2200)	M/S AASAA (Agni Aero Sprts Adventure Academy (P) Ltd., Hangar # 2, Jakkur Aerodrome, 12th KM, Bellary Road, BANGALORE-560 064 Tele: 080-28565574 080-28560060 FAX:080-28569152 e-mail:agniaviators@yahoo.com

Appendix `D'
(refers to para 5 (f) of SOP 01/2015)

FORMAT FOR SUPPLY ORDER

Tele: 011-

Fax:011-

HQ DG NCC
Min of Defence
West Block-4
R K Puram,
New Delhi – 66

3003/---------- Jun 15

M/S----------(Attn: Mr----------)

PURCHASE ORDER / ACCEPTANCE OF TENDER No. ------ / 2015

Dear Sir,

1. It is hereby communicated that your quotation vide letter No. ---------- dated ---------- / as per your price catalogue has been accepted for items as per the attached Appendix, with standard terms and conditions mentioned herein.

2. **Specification**: As per OEM / certified by DGCA or equivalent authority.

3. **Inspection Authority**: CO receiving unit duly supported by firm's certification.

4. **Place of Inspection**: At Consignee's premises.

5. **Identification & Packing Instruction**: The stores shall be securely packed to avoid loss or damage during transit and for storage without any additional cost to the Government.

6. **Mode of Dispatch**: The stores shall be dispatched to the Consignee by the supplier on his own arrangement.

7. **Terms of Delivery**: F. O. R. Destination:---------- Air NCC Sqn, ---------- (place).

8. **Delivery Schedule**: **(The essence of the contract):** immediate / In month from the date of this Supply Order (as the case may be).

9. Failure & Termination: If the Contractor fails to deliver the stores or any installment thereof within the fixed for such delivery or any time repudiates the contract before the expiry of such period , the purchaser may without prejudice to the right of the purchaser to recover damages for breach of the contract .

10. **Option Clause**: The purchaser reserves the right to increase or decrease the contracted quantity upto 50% that may be ordered at the same rates and on same terms & conditions at any time during the currency of the contract.

11. **Paying Officer**: Controller of Defence Accounts (CDA), Tigris Road, - Delhi.

12. **Code Head**: Major Head -

Minor Head –

13. **Warranty / Guarantee**: The contractor / seller hereby will submit a certificate declaring that the articles / services sold / supplied / rendered to the purchaser under this contract shall be of the best quality and workmanship and new in all respects and shall be strictly in accordance with the specification and particulars contained / mentioned in contract. The contractor / seller hereby guarantees that the said goods / stores / articles would continue to the description and quality aforesaid for a period of thirteen months, from the date of delivery of the said goods / stores / articles to the purchaser, and will rectify any defect or defects free of cost during aforesaid warranty period.

14. **Terms of Payment**:Within 30 days of dispatch of materials / completion of installation / repairs on submission of following documents:-

(a) Contractors bill with affixed revenue stamp
(b) Original Supply Order
(c) Quotation
(d) Acceptance Certificate duly ink signed by CO unit

15. **Arbitration**: All disputes, differences or questions between the parties prior to touching the subject

16. **Jurisdiction of Courts**: The courts of the place from where the acceptance of tender has been issued shall alone have the jurisdiction to decide any dispute arising out of or in respect of the contract.

17. This has the concurrence of ---------- (Designation) as the Competent Financial Authority (CFA) vide ---------- dated ---------- and funds for this commitment have been booked under the relevant code head at Sl No. ---------- of Budgetary Control Register.

Signature of Purchase Officer

Encl: Annexure to Purchase Order

ANNEXURE TO PURCHASE ORDER No. ------ / 2015
DATED ---------- Jun 2015

MICROLITE NO.---------- ZEN-AIR / X-AIRNo. 1 (TN) Air NCC Sqn : LTR REF 3003/---------- Jun 2015

Sl No	Part No.	Description	Quantity		Unit / Basic Price in Indian Rupees	ED	
			Denomination	Required		In %	In Rs.
(a)	(b)	©	(d)	(e)	(f)	(g)	(h)

Sales Tax		VAT		SC/MST---		Any other Taxes		Any other charges (specify)		Total Amount In Indian Rupees
In %	In Rs.	In %	In Rs.	In %	In Rs.	In %	In Rs.	In %	In Rs.	
(j)	(k)	(i)	(m)	(n)	(o)	(p)	(q)	©	(s)	(t)

Note: 1. Total Amount indicated above is all inclusive.

2. Delivery of items would at No.----------
(consignee unit's name & place)
3. Installation / commissioning is to be / not to be undertaken by the firm at site. Charges included above. (to be deleted by Purchase Officer, whichever not applicable).
4. No charges other than specifically mentioned in the quotation and accepted in this Supply Order would be admissible.
5. Delivery / Installation is to be completed by ----------.

Signature of Purchase Officer with Stamp & Date

Appendix `E'
(refers to para 5 (g) of SOP 01/2015)

FORMAT FOR ACCEPTANCE CERTIFICATE ACCEPTANCE CERTIFICATE

1. This is to certify that the following items / quantity ordered vide HQ DG NCC **Supply Order** No.----- vide 3003/---------- dated ---------- have been supplied by M/S ---------- . The items is/are new and serviceable. The same is/are accepted and have been brought on charge vide CRV No. i.e. (Unit No./CRV/EX/RV/----------) (FY------) dated ----------.

Sl No	Part No.	Description	Qty Ordered	Qty Supplied	Remarks

2. This is to certify that the following items / quantity ordered for **supply and installation** vide HQ DG NCC Supply / Work Order No. ------- vide 3003/---------- dated ---------- have been supplied and installed by M/S ---------- satisfactorily. The same is/are accepted and have been brought on charge vide CRV No. i.e. (Unit No./CRV/EX/RV/----------) (FY------) dated ----------.

Sl No	Part No.	Description	Qty Ordered	Qty Installed	Remarks

3. This is to certify that the following repairs ordered vide HQ DG NCC Repair Order No.---------- vide 3003/---------- dated ---------- have been satisfactorily completed by M/S ----------.

Sl No	Part No./ ML No.	Description of Defect	Rectification done by	Remarks

Sign with particulars of

Collected by **Firm's Technician** **Commanding Officer**

Appendix `F'
(refers to Para 6 (a) of SOP 01/2015)

FORMAT FOR REPORT FOR REPAIR REQUISITION DEFECT SURVEY REPORT

MICROLTE ZEN-AIR / X-AIR NO. ---------- UNIT ---------DEMAND NO. ----------

Sl No	Exact Fault / Defect	Suggested Repair work to rectify the fault	Items that need to be replaced	Remarks

Details of survey carried out with cost estimation, name and address of the firm (separate for engine and Airframe).

Prepared by

Sign of MWO/WO/JWO i/c

Recommendation of Commanding Officer

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES: AIR NCC SQN

1. To forward demand for spares / repair / servicing requirement of ML with part No. / Reference No. as per catalogue pertaining to Airframe / engine etc. and / or details of defects for repair to DG NCC Lgs (Air) as per **Appendices `A' .**

2. **In case of Supply of item**, commanding Officer to issue 'Acceptance certificate' (as per **Appendix `E'**) to the firm after satisfying himself regarding quality, quantity and suitability of the supplied store/items. An ink signed copy is to be forwarded immediately to JD Lgs (Air) at HQ DG NCC for payments action.

3. **In case of an installation** / **commissioning** as mentioned in the supply order, the Acceptance Certificate (as per **Appendix `E'**) would only be issued by the unit to the firm after satisfactory completion of installation / commissioning.

4. **In case of repair**, to issue Acceptance certificate signed by the commanding Officer (as per **Appendix `E'**) on receipt of store to the firm on satisfactory completion of repairs for claiming balance 100 % payment. An ink signed copy is to be faxed immediately to JD Lgs (Air) at HQ DG NCC.

5. To resort to LP / repair of commonly available items / low value items / non-proprietary items, by inviting quotations as per LP procedure.

6. To clear the LP bills at unit level, from the funds allotted to their respective Dte and ensure payment through respective CsDA.

7. To BOC and account for all the items received / purchased / repaired and ensure proper storage till their utilization.

8. All unserviceable items accumulated at Air Sqns (other than those on DR/PWR action) will be dispatched to their respective Dte at least once in three months.

9. To conduct an annual BOO (in the month of Apr) for auctioning of items and deposit the proceeds in govt.

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES

RESPONSIBILITIES OF 2 (Kar) AIR NCC SQN

1. Will be responsible for conduct of TETTRA (Technical Type Training) course on ZEN Microlight as per the training programme forwarded by JD (Tech) Air.

2. Will ensure that allotted amount (for TETTRA Course) is sanctioned well in advance (approx 15 days) prior to commencement of TETTRA Course.

3. Will ensure that the sanctioned amount is properly utilized for the course as per expenditure projected in the SOC for allotment of funds by following financial regulations as per DPM 2009.

4. Will ensure adequate accommodation for the participating Air Warriors.

5. Will ensure proper conduct of TETTRA Course as per approved syllabus and other latest directives issued by DG NCC. He will liaise with NCC liaison Cell to coordinate conduct of practical training to the Air Force Technicians.

6. Will ensure conduct of special practical training of Engine fitting at OEM premises (as per **requirement**) and for other trades at AASA in liaison with NCC LC.

7. Will suggest improvements of any to JD (Tech) Air for any incorporating any changes in the training curriculum.

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES: NCC LIAISON CELL (AIR), BENGALURU

1. The roll of NCC Liaison Cell (Air) is to act as a representative of NCC in respect of all techno-logistic matters connected to procurement of Microlite spares and over-see & supervise the repair / overhaul / maintenance / servicing of Microlite and aeroengine carried out at OEMs premises. The charter of duties is as elaborated in the following paras:-

Technical Task

2. The following technical tasks are to be performed by technical staff of NCC Liaison Cell (Air):-

Technical- General

(a) Facilitating taking over of new microlite and its aeroengine by the ground acceptance party of respective operating unit.

(b) Carrying out of Joint survey by NCC Liaison Cell (Air), representative from concern user unit and OEM on receipt of microlite/aeroengine at firm's premise for repair/overhaul/modification/servicing.

(c) Based on survey report, facilitate/liaison the firm to forward their quote covering repair work, transportation back to unit and reassembling at unit.

(d) Monitoring of progress of repair/overhaul/modification/servicing on daily basis and furnish report to the HQ DG NCC.

(e) Liaisoning with OEM to send repair/survey parties to various Microlite operating units on instruction of HQ DG NCC.

(f) Monitoring progress and expedite repair/rectification of visiting microlite during VSC/AIVSC.

(g) Coordination of work done report for visiting microlite on snag rectification at OEMs premises.

(h) Taking up with HQ DG NCC for allotment out of Microlite, overhauled/repaired by OEM after successful air test.

(j) Coordinating any other NCC work connected with OEMs, entrusted by HQ DG NCC. (Liaising, coordinating & arranging for deficiencies of spares as found in crated aircraft/aeroengine due to categorization)

(k) To assist retrieval of serviceable components of downgraded Microlite to build up centralized ML Store.

Technical- Quality Assurance

(l) Representing NCC at defect investigation meeting held in OEM for microlite and its aero engine. Coordinating, progressing and finalization of defect investigation of component with concern agency.

(m) Maintaining computerised data bank of DIRs and forwarding the details to concerned agencies.

(n) Deliberation with OEMs for recommending suitable and adequate remedial measures for evolving modifications as remedial measure and the early issue of suitable technical instructions.

(o) Representing NCC during investigation on premature withdrawal of components as and when instructed by HQ DG NCC.

(p) Liaisoning with OEM for implementation of various measures to be taken to improve quality and serviceability of microlite and its aeroengine.

(q) Representating NCC for salvage board, categorisation board meeting planed at OEM premises.

(r) Participating and expediting progress on life extension/reliability study of microlite and its aeroengine.

(s) Joint acceptance by NCC Liaison Cell (Air), representive of concerned unit and the firm to be carried out after the successful compliance of repair and air test on OEM premise.

(t) Coordinating and arranging various capsule courses conducted by OEMs for NCC technical personnel as and when instructed by HQ DG NCC.

(u) To provide quality assurance of items despatched to user units and also to act as liaison representative of the NCC with OEMs in all matters connected with supply of spares and technical clarification related to the items. Following point to be ensured towards this:

(i) Pre-receipt inspection of all components received from OEMs. Pre issue inspection of all components dispatched to various operating units.

(ii) Inspection of all components received from all operating units as instructed by HQ DG NCC.

(iii) Periodic inspection of all components held on charge of NCC Liaison Cell (Air).

(iv) Re-identification of components when identity is lost due to lose of identification labels.

(v) Downgradation of components which are not fit use in microlite.

(vi) Maintenance of tech publication and literature on lifing policy.

(vii) Capturing life of all components received from repair agency.

(viii) Preservation of five year rubberized kit for Airframe and engine available in store of microlites at specified interval.

Logistics Task

3. The following logistics tasks are to be performed by logistic staff of NCC Liaison Cell (Air):-

(a) Receipt, storage, issue and accounting of components to cater for operating unit's requirement as decided time to time by HQ DG NCC.

(b) Loading of components to OEMs for repair/overhaul/functional test/life extension study.

(c) Expediting progress on repair/overhaul/functional test/life extension study.

(d) Receipt and storage of repaired /overhauled components from OEMs and their subsequent issue to operating Units in NCC.

(e) Loading of components to OEM for defect investigation/premature withdrawal investigation as and when received from operating units.

(f) Placing urgent requisition to OEMs for expediting repair of components.

(g) Monitoring and progressing priority demands for an early materialisation through regular interaction with OEMs.

(h) Ensuring periodic inspection and preservation of stored components as per specified periodicity.

(j) Maintaining Storage and preservation life of stored components and ensuring necessary actions for revival of storage/preservation life before expiry of storage/preservation life.

(k) Life monitoring of all serviceable components stored and take appropriate actions.

(l) Retrieval of serviceable components of downgrade microlite and buildup microlite store.

(m) Loading of components to OEM for assessment as instructed by HQ DG NCC.

(n) The transportation functions for incoming items, such as unloading unpacking and passing them to storage sites of incoming items. Progressing of claims and Discrepancy reports (DRs) if any. And maintaining all records related to all these aspects.

(o) The transportation functions for outgoing items such as packing, marking, loading, despatching of outgoing items.

(p) Providing inputs to HQ DG NCC regarding product support monitoring on fortnightly basis.

(q) To liaise with concern operating unit, directorate and HQ DG NCC for prompt execution of in-situ repair by the firm's representative.

(r) Collection and returning of all replaced items to operating unit after repair/servicing/overhaul of microlite/aeroengine by the OEM. Maintenance of accounting of the same.

(s) Price negotiation against quotation received from the firms as and when directed by HQ DG NCC.

Equipment Accounting Task

4. The unit will be self accounting with respect to equipment accounting of NCC stores. The following equipment account tasks are to be performed by equipment accounting staff of NCC Liaison Cell (Air):-

(a) Maintenance of all equipment accounts section record such as voucher registry and voucher library.

(b) Linking of external issue and receipt vouchers correspondences on external issue and receipt vouchers. Ensuring appropriate action for outstanding issues/correspondence related to completion of voucher actions.

(c) Clearing of all invoices of OEMs for payment.

(d) Maintaining of loan records in respect items issued to OEMs for overhaul/repair. Monitoring of loan register and record of timely return of loaded items.

(e) Undertaking loan reconciliation with OEMs periodically and taking action for time barred loan as per procedure.

(f) All auditing correspondence related to the units.

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES: NCC DTEs

1. To accord sanction to Air NCC Sqns under their Dte for LP / repair of commonly available items / low value items / non-proprietary items viz. Batteries, Araldite, measuring cans, chamois leather, etc. so as to obviate the air assets being on ground / unserviceable for trivial items and avoidable procedural delays through central provisioning. The bills for these purchases would be cleared through respective CsDA

2. To allot funds to Air NCC Sqns under their Dte for LP / repair of commonly available items / low value items / non-proprietary items.

3. To monitor clearance of bills pertaining to LP resorted to by Air NCC Sqns under their Dte.

4. To monitor expeditious issue of Acceptance Certificate by Air NCC Sqns under their Dte for items received / Repair / servicing completed against centralized LP Order placed by JD Lgs (Air).

5. To send a quarterly return of the unserviceable/salvage stock held (other than those on DR/PWR action) to HQ DGNCC.

6. To conduct a BOO annually in the month of April for auctioning the items and deposit the proceeds in govt. treasury through an MRO. A copy of the board proceedings and MRO are to be sent to HQ DGNCC (Lgs Air Cell) for information.

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES: JD LGS (AIR)

1. To collate recurring requirements as per consumption pattern / advice by OEM or supplier as well as examine demands received from various Air NCC Sqns.

2. To call for quotation from the OEM / supplier for repair / demanded items on approved format **(as per Appendix `B')**. The price called for / submitted by the firm will be on FOR for direct supply to the demanding unit and installation in situ (if required). In case the required item is listed in the Annual Price List of the firm calling of quotation would be dispensed with.

3. To hold negotiation, if considered necessary, through a BOO.

4. To obtain approval of CFA for the finalized price (including taxes, charges, installation, commissioning etc. if any) and to place appropriate supply / work / repair order on the concerned firm / OEM for procurement / taking up rectification for which quotation has been already received from the firm

5. Lgs (Air) will carry out follow up action with Lgs B–2 for fund allotment on earmarked basis under code head 01/544/01 for air assets.

6. To monitor the fund allotted under code head 01/544/01 and forecast further demand of funds wherever necessary.

7. To obtain CFA sanction for all purchase / repair / work prior to placement of order.

8. To process the bill for payment to the firm from CDA.

Appendix`G'
(refers to para 11 of SOP 01/2015)

DUTIES AND RESPONSIBILITIES: JD TECH (AIR)

1. He is the specialist officer posted to oversee the technical aspects related to Microlites aircraft and other air equipment.

2. Training of maintenance staff of Microlites.

3. He is to monitor repair of Microlites.

4. Act as adviser to DDG Lgs and all Air Sqns on all technical aspects relating to Microlites.

Appendix 'H'
(refers to Para 13 of SOP 01/2015)

TO BE FILLED BY CONSIGNEE	**CERTIFICATE RECEIPT VOUCHER**	
ACCOUNTING UNIT…….. RECEIPT VOUCHER NO …… DATE OF RECEIPT…… PERIOD…… MODE OF RECEIPT……. ……	NAME AND ADDRESS OF CONSIGNEE UNIT/AGENCY…… ADDRESS…… ……..… ……....	NAME AND ADDRESS OF CONSIGNOR UNIT/AGENCY…….. ADDRESS…… …… ……

PART NO	DESCRIPTION	DOQ	QTY RECEIVED	CASE MARKING	RATE	VALUE	REMARKS

RECEIVED BY CONSIGNEE		UNPACKED AND CHECKED BY		ENTERED ON LEDGER CONSIGNEE	
INITIALS	DATE	INITIALS	DATE	INITIALS	DATE

Signature Rank Officer Receiving Equipment

Appendix J'
(refers to Para 15 of SOP 01/2015)

INTERNAL DEMAND AND ISSUE VOUCHER

Demand SI No……. Date ……. Internal Voucher No……..

Flt/Sec…… Unit……. Financial Year ……

Ref/Part No	Section……. Description	DOQ	Quantity		Posted	Remarks
			Demanded	Supplied		

Inv Holder/Sec Cdr Demanding **Inv Holder / Sec Cdr Receiving**

Issuing Store Keeper		Entered on SSRC	
Initial	Date	Initial	Date

Appendix 'K'
(refers to Para 19 of SOP 01/2015)

INTERNAL RETURN AND RECEIPT VOUCHER

Demand SI No……. Date ……. Internal Return Voucher No……..

Flt/Sec…… Unit……. Financial Year ……

Ref/Part No	Section……. Description	DOQ	Quantity		Posted	Remarks
			Returned	Category		

Inv Holder/Sec Cdr Returning

Receiving Store Keeper		Entered on Ledger	
Initial	Date	Initial	Date

Appx 'L'
(Refers to Para 27 of SOP 1/2012)

Section 7

SERVICE AND MAINTENANCE

CARE OF YOUR AIRCRAFT:

Always handle the aircraft with care. Do not push on any control surface (this include the stabilizer). To push the tail down, lift the prop hub or push down on the rear fuselage. To move the aircraft, do not push or pull at the centre of the struts, as the struts are inappropriate for safe flying. Pushing or pulling is acceptable on the gear and at the bottom and top of the struts (close to their attachment points). In all circumstances, follow all safety precautions pertaining to aircraft, especially around the propeller area.

As the STOL CH 701 is an all metal aircraft built from high Strength aviation grade aluminum alloys which have good corrosion resistant characteristics, little care to the airframe is required, even when stored outside. Polyurethane paint will keep the high gloss for many years when sponged with water. A cup of dish water liquid in a pail of water will help remove unwanted dirt. Always rinse thoroughly with fresh water after washing.

MAINTENANCE PROGRAM

The following maintenance program outlines the minimal maintenance which must be followed to keep the aircraft in good flying condition. The suggested time interval of 25 hour does not in any sense eliminate the need for routine maintenance before and after each flight. Maintenance is part of the pilot's responsibilities: the pilot should be assured that the aircraft is airworthy at all times. The recommended 25 and 100 hour maintenance checks are designed to cover areas frequently neglected in the quicker pre-flight inspection, and serve only as a useful indication of the required maintenance.

Record all maintenance and repairs in the Aircraft Log Book. Aircraft servicing and maintenance should be performed by a qualified individual. For spare or replacement airframe parts, use genuine Zen Air parts to guarantee long life and durability. Use only genuine engine manufacturer parts on the engine. Contact your Zen Air dealer or the manufacturer for all your service, maintenance and parts requirements.

EVERY 25 HOURS

Check the general condition of the STOL CH 701, and in particular the following:

GENERAL: Verify that no cables are chafed, check for proper anchorage and attachment of all items (fuel, coolant & oil lines, electrics, etc). Verify that all fasteners and pins have the required “safety”.

CONBTROLS: Check for rust on steel parts (clean and repaint as required). Lubricate all moving parts (hinges, control Attachments, bearing, etc.). Verify that all controls operate smoothly and that they are firmly attached.

LANDING GEAR: Inspect nose gear stops, bungee, control and inspect the main spring, wheel forks and axles.

CABIN INTERIOR: Clean with household cleaners according to the materials. Soap or detergent and water is not recommended for cleaning the upholstery since they could remove some of fire retardant with which the seats may have been treated.

WINDSHIELD AND WINDOWS: The windshield is a single piece of Polycarbonate plastic, highly resistant to impacts. Clean with “Windex” as the polycarbonate will craze with most chemicals. **DO NOT USE** gasoline, alcohol, oil, lacquer, benzene, acetone, paint, thinner, etc. The optional protective windshield cover will protect it from dust, sand and curious onlookers.

BATTERY: Check fluid level, especially in hot weather. Maintain the level at the top level mark by adding distilled water as required (read instructions located on battery). DO NOT OVERFILL as spillage may corrode the airframe.

WOOD PROPELLER: Wood propellers are inexpensive and dampen vibrations efficiently; but maintenance is required to keep the propeller in proper condition. The prop may need periodic re-varnishing. Check the tips and leading edges for damage. Look for nicks and cracks. Inspect spinner, bolts (tight and secured). Wiping the propeller with an oily cloth will result in cleaning off grass and bug stains. DO NOT OPERATE AIRPLANE IN RAIN since the propeller will get damaged.

ENGINE COMPARTMENT: Thoroughly check and inspect the engine compartment, including the reduction gear unit, exhaust system, fuel system, oil system, and coolant system. Remove and clean the carburetor bowls. Clean (replace if required) the carburetor air filter. The engine and compartment should be kept free of any accumulation of oil, grease and dirt to prevent a fire hazard. See the Engine Manual for more information.

ENGINE: Refer to engine Manual.

ENGINE COWLING: Check for looseness, “DZUS” fasteners, front pins, and any damage or cracks. Make sure it is properly Secured.

FUEL: Remove, clean and re install gascolator. Inspect for any leaks and loose fittings in the lines and tank(s) and assure the smooth operation of shut off valves. Clean (or replace) any installed filters.

EVERY 100 HOURS, OR SIX MONTHS (whichever comes first)

Clean the aircraft: exterior and interior and remove the rear fuselage bottom access door.

Make a thorough inspection of the whole aircraft, inspecting for any damage, wear, or corrosion.

FRONT OF AIRCRAFT: Check and inspect the following: Engine (see Engine Manual), Controls and hoses, engine mount, propeller, battery, exhaust, radiator, firewall, nose gear and wheel. Check that all bolts and nuts are tight and safety tied.

FUEL SYSTEM: Check for leaks, check condition and safety of lines and valves operation. Clean, re-install (or replace) and secure all filters, gascolator and tank finger screen.

FUSELAGE: Check skins and internal structure for loose rivets, bolts, corrosion, and buckling due to miss handling or over stressing. Check that the drain holes in the bottom of the fuselage are not plugged up.

CONTROLS: Inspect for looseness, wear, fair leads, and terminals.

INSTRUMENTS: Check screws, fuses, markings, switches, pilot lines. Ensure that all the instruments are functioning correctly.

WINGS AND STRUTS: Check skins, replace loose rivets, check for corrosion and buckles (from mishandling), inspect leading edges and trailing edges. Check bolts and safety (struts, jury struts, wing root attachments, slats and flaperons). Check control surface stops and flaperon interconnection.

TAIL: Inspect skins and rivets, and look for and correct corrosion, etc. Check attachment of tail sections to fuselage, cable ends, trim tab, etc. check control surface stops.

LANDING GEAR: Refer to the 25 hour check list.

OIL OR GREASE all moving parts: See following table.

After the thorough inspection of the aircraft and after having done the required maintenance and / or repairs, re-install the rear fuselage access door and run the engine for smooth operation.

100 HOUR OIL SHCEDULE

Check all control hinges and moving parts for wear. Replace when Clearance exceeds maximum wear of .025" (.6mm).

Oil the following (with standard "motor oil"):

All	bearings
All	flaperon hinge points
All	flaperon control rods*
	Roll control torque tube
	Elevator and trim (hinge+control)
All	rudder hinge points
All	elevator bell cranks*
	Flaperon mixer*
All	Pitch control rod ends*
All	control stick bearings (in cabin)
	Pedals (3 bearing, cable ends, brake pedals)
	Flaperon and trim controls
All	cable ends (also*)
All	throttle bearings
	Choke control (if applicable)
All	brake lines (mechanical)
All	door hinges and latch

*Inside fuselage-access through fuselage door.
Grease (with ball bearing grease): The nose gear strut (top and Bottom bearing) and nose wheel axle and grease all cable fairleads.

Main gear spring attachment: Check that the rubber pads are undamaged and properly secured in place (check top and bottom, right and left sides).

Appx 'M'
(Refers to Para 25 of SOP 1/2012)

MAINTENANCE MANUAL

Maintenance Concept

General note : The maintenance functions detailed in this Manual fall into two categories:

- Maintenance I (Line Maintenance)
- Maintenance II (Heavy Maintenance)
- Repairs beyond the levels detailed in this Manual are not recommended as maintenance functions and must be done by an authorized overhaul facility.

Maintenance I (Chapter 00, 05 and 12)

(Line Maintenance) The scope of line maintenance consists of removal, installation and adjustment of engine components (including part wear). All procedures in this Manual are to be considered line maintenance.

NOTES: Where applicable, you will be referred to the Heavy Maintenance Manual for work above and beyond line maintenance.

Maintenance II separate Manual

(Heavy Maintenance) Maintenance Manual II details removal, installation and repair of components or parts normally considered beyond the capabilities of the "Line Maintenance".

NOTES: This Manual can only be used in combination with Maintenance Manual I (Line Maintenance), as it builds up on it.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

MAINTENANCE MANUAL

1) Definition of terms

1.1) Operating hours

Definition. All of the maintenance intervals, such as the 100 hr. Inspection and the engine TBO, relate to the number of operating hours of the engine.

The operating hours are defined as follows in order to prevent misunderstandings and to ensure safety:

- All time during which the engine is running is counted towards the total number of operating hours.

- The time is counted irrespective of the load factor of the engine, such as idling or take-off power.

NOTES: A mechanical hour meter is directly coupled to the engine speed; the readings may deviate considerably from 1 hose given by electronic remitters (e.g. TCU, FlyDat). Maintenance and overhaul intervals are always dictated by the readings of the electronic hour meter.

- The planned inspections to be performed at certain intervals are based on experience from test runs and field observations. They are intended as precautionary maintenance measures in order to ensure continued trouble-free operation of the engine.

1.2) Time limit

Definition. Time limits are predetermined time spans and intervals which are based either on calendar intervals or the number of engine operating hours. Once the time limits have been reached, the affected parts must either be replaced for a general overhaul or maintenance work must be per-formed. These precautionary maintenance measures are designed to avoid engine malfunctions or defects and ensure continued airworthiness of the engine.

1.3) Life cycle

Definition. The life cycle is always specified as an exact time span and is also quoted in flight hours. NOTES: Parts with a limited life cycle must be taken out of operation and overhauled if the specified time span or number of flight hours is reached (whichever comes first).

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

1.4) General overhaul(TBO)

Definition. The time between overhauls (TBO) for all objects (such as the engine, component assemblies, add-on components) is the approved length of operation under normal operating conditions before it becomes mandatory to send in these objects for an overhaul.

Normal operating conditions are the conditions which comply with the manufacturers and the aviation authority's recommendations for the certification of airworthiness.

Maintenance of operation

The TBO values approved by the relevant of authorities is based on performance tests and empirical values which have been gathered through operation of the engine and are required for the acceptance and certification of airworthiness. TBO values can be changed in response to possible grade/expansion programs.

Legal obligation

TBO values for the engines are always shown in operating hours and years. The user must record the operating hours in the engine log book.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

2) Time limit

General

NOTICE: A general overhaul is due after a defined period of operation or after a specified calendar life since initial start of operation (whichever comes first).

After reaching

NOTICE**:** After reaching this time limit, the engine this to be shipped to an authorized ROTAX overhaul facility.For an overhaul, the engine must be removed from the aircraft, be cleaned, preserved and all openings to be closed to prevent entering of contaminants.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Engine Type description	Engine affected engine S/N	TBO Time Between Overhaul
912 A	Up to and incl 4,076.191	600 hr. or 10 years. Whichever comes first(1
912 A	From 4,076.192 up to and incl 4,410.065	1000 hr. or 10 years. Whichever comes first(1
912 A	From 4,410.066 up to and incl 4,410.471	1200 hr. or 10 years. Whichever comes first(1
912 A	From 4,410.472 up to and incl 4,410.856	1500 hr. or 12 years. Whichever comes first(1
912 A	From 4,410.857	2000 hr. or 15 years, whichever comes first (1
912 F	Up to and incl. 4,412.585	1000 hr. or 10 years. Whichever comes first(1
912 F	from 4,412.586 up to and incl. 4,412.816	1200 hr. or 10 years, whichever comes first(1
912 F	From 4,412.817 up to and incl. 4, 412.974	1500 hr. or 12 years, whichever comes first(1
912 F	From 4,412.975	2000 hr. or 15 years whichever comes first(1
912 S	Up to and incl 4, 922.776	1200 hr. or 10 years, whichever comes first(1
912 S	From 4,922.777 up to and incl. 4,923.889	1500 hr. or 12 years, whichever comes first(1
912 S	From 4,923.890	2000 hr. or 15 years, whichever comes first(1
912 UL	Up to and incl. 4,152.666	600 hr. or 10 years, whichever comes first(1
912 UL	From 4,152.667 up to and incl, 4,404.717	1200 hr. or 15 years, whichever comes first(1
912 UL	From 4,404.718 up to and incl. 4,409.715	1500 hr. or 15 years, whichever comes first(1
912 UL	From 4,409.716	2000 hr. or 15 years, whichever comes first(1
912 ULS	Up to and incl 4,427.532	1200 hr. or 10 years, Whichever comes first(1
912 ULS	From 4,427.533 up to and incl. 6,775.789	1500 hr. or 12 years, whichever comes first.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Engine Typer description	Engine affected engine S/N	TBO Time Between Overhaul
912 ULS	From 6,775.790	2000 hr. or 15 years, Whichever comes first(1
912 ULSFR	Up to and incl 4,429.714	1200 hr. or 12 years, whichever comes first.
912 ULSFR	from 4, 429.715 up to and incl. 6, 775.789	1500hr.or 12 years whichever comes first
912 ULSFR	From 6, 775.790	2000 hr. or 15 years whichever comes first

For the TBO of the specific engine type/version refer to the table below.
([1] Extension of the TBO is possible and will be specified by a Service Bulletin (SB) for the respective engine type. For extensions already effective refer to the engine log book or release certificate.

Authorized exceeding	Extension or exceeding of the TBO by 5% or 6 months is allowed which-ever comes first.
Shipment	The shipment to an authorized ROTAX overhaul facility must include the following:

1	Engine log book.
2	Maintenance records of the engine (i.e. all maintenance check lists, and reports of operation, of maintenance, of findings and of oil analyses).
3	The engine assembly as per supply volume. Additionally all added-on parts as in the supply volume such as carburettors, filters, fuel pump, external generator, sensors, ignition unit, electric starter, oil tank.
4	Indication of total engine operating hours (TSN) and where applicable, engine operating hours since a previous overhaul(TSO) **NOTE:** This information must be supplied to allow the service history of components to be traced.
5	Data about the type of aircraft used.
6	Useful remarks and observations concerning the engine.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

2.1) Time limit for rubber parts

General note: NOTICE This time limit must be followed independently and in addition to the visual inspections (see chap. 020.00 section: 5.1)) of the respective components.

Time limit The following components and systems must be replaced every 5 years:

- Venting hose of the carburettors	
- all rubber hoses of the cooling system	
- all rubber hoses of the fuel system (incl. Teflon hoses)	Fuel pump and insulating flange, if this is fixed with fuel hoses.
- All rubber hoses of the lubrication system which are part of the engine supply volume and if they are not in the maintenance schedule of aircraft manufacturer	
- Carburettor sockets	
- Connecting hose of the air intake system	
- Diaphragm on both carburettors	
- Rubber hoses on compensating tube	
- V-belt	

2.2) Time limit for the coolant

General note: Coolant must be replaced as per manufacturer's instructions, at the latest during overhaul or when the engine is replaced.

2.3) Annual inspection

General note: A 100 hr. inspection is to be carried out periodically after every 100 hours of operation or every 12 months, whichever comes first. See chap. 05-10-00 section: 2)

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

MAINTENANCE MANUAL

Chapter: 05-20-00

SCHEDULED MAINTENANCE CHECKS

Introduction

The owner and/or user is primarily responsible for the maintenance and airworthiness of the engine. This includes compliance with all applicable airworthiness directives.

This inspection protocol is not intended to be all- inclusive, for no such protocol can replace the knowledge and experience of a certified aircraft mechanic. As the party primarily responsible for the maintenance and airworthiness of the engine, the owner or user should only have the maintenance work carried out by qualified engineers.

Documentation required

It is the responsibility of the owner and/or user to make sure that the aircraft mechanic performing the work on the engine has access to the previous Inspection Protocols and any other required documents.

Table contents

This chapter of the Maintenance Manual contains general information regarding periodic maintenance and the maintenance check list.

Refer: BRP-Powertrain (MAINTENANCE MANUAL)

1) **Scheduled maintenance checks**

Definition This section lists the periodic inspections which must be carried out after a specified periods of operation

Intervals Periodic inspections are those which must be performed at 50,100,200,600 hr. intervals in accordance with chap. 05-20.00. Section: 5.1).

This means for example that every 100 hr. of operation a 100 hr. check and all 200 hr. Additional checks as per maintenance check list must be carried out.

	Intervals - hours									
	25 hr	100 hr	200 hr	300 hr	400 hr	500 hr	600 hr	700 hr	to	2000 hr
100 hr	*	*	*	*	*	*	*	*		*
200 hr			*		*		*			
600 hr										

100 hr. check

- In order to demonstrate continued airworthiness, an engine must be inspected after every 100 hours of operation.
- For the intervals between maintenance work, a tolerance of !10 hr. is permissible, but these tolerance must not be exceeded. This means that if a100 hr. check is actually carried out 110 hr., the next check will be due at 200 hr. !10hr. and not at 210 hr.!10 hr.
- If maintenance is performed before the prescribed interval, the next maintenance check is to be done at the same interval (e.g. if first 100 hr. check is done after 87 hours of operation , the next 100 hr. check must be carried out after 187 hours of operation).

Special hr. Check NOTES: This maintenance schedule contains a column for a 50 hr. check. This check is recommended by the manufacturer but not essential, with the exception of oil change when operating with leaded **AVGAS**.

25-hr.check

- In order to demonstrate continued airworthiness, an engine must be inspected after the first 25 hours of operation.

-The checks performed at the 25 hr. Inspections are the same as for the 100 hr inspection. This applies both to newly delivered engines and to overhauled engines.

2) **Unscheduled maintenance checks**

Operating limits An inspection of the engine must be performed if the operating limits of the engine have been exceeded (e.g. overspeed, excessive temperature etc.), or if unusual operating conditions have occurred during operation (e.g.lightning strike). In such cases the engine must be inspected in accordance with the applicable unscheduled maintenance checks. (See chapter 05-50-00).

Recommends inspections The manufacturer also recommends the following inspections whenever maintenance is carried out (where not already prescribed by the airframe manufacturer, as possible malfunctions could have negative effects on engine operation.

	Inspection	Possible danger
Engine cowling	For discolouring and warping.	Danger of overheating
Exhaust fixation	Re-tighten the exhaust fixation on the cylinder head after the first 2 hr. of operation.	Leakage
Exhaust	Of the exhaust unit (where necessary, replaced application of LOCTITE Anti-Seize	Risk of fracture, wear. Smooth engine running.
Fuel filter	Of fuel filter on airframe side (for foreign bodies, sealing material and loose fragmented material).	Engine to misfire. Power loss. Engine running too lean (Engine malfunction and damage).
Electr, fuel pump	Correct function	Insufficient fuel supply. Engine running to lean (Engine malfunction and damage).
Battery	Acid concentration for each cell Observe the manufacturers instruction.	Starting problems.
Oil	For oil contamination Analyse the oil (provides additional information on the condition of the engine).	Possible engine wear
Radiators, Lines	For damage. Check for discoloration – and cracks.	Danger of overheating
Propeller	Undamaged and runs true	Engine damage, unusual vibrations

Refer: BRP-Powertrain (MAINTENANCE MANUAL

Appendix 'N
(Refers to para 31 of SOP 01/2015)

8-2 Airframe maintenance
(to be carried out periodically as per table below)

The following maintenance tables never can replace the pre-flight check, obligatory before every take-off

Note: these maintenance periods concern only the aircrafts flying under a continental climate and being stocked under hangar. The aircrafts submitted to other conditions will have to be more frequently checked.

Periodicity	1 month 50 h	6 month 150 h	1 Year 300 hr	2 year 600 h	5 Year 900 h
Wings, control surfaces and empennage fabrics			v		c
Fork and landing gear					
Tyres Pressue (1.8)	V				
Tyres wear	V				
Brakes wear	V				
Front fork and main gear shok absorbers	v				
Windsreen		V			
Controls					
Ailerons cables	V	L			C
Ailerons tubes and socket-joints	V	L			C
Rudder cables	V		V		C
Handle stick joint	L				C
Elevator control	V		V		C
Choke and throttle cables	V	L			C
Flaps control	V				C
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires		V			
Battery		V			
Fuel hoses	v				R
Handle fuel pump	v			R	
Fuel filter	v	R			
Fuel tank		V			
Control surfaces, trim, mobile parts					
Axels	L				C
Bellcrank / quick links		V			C
Cable trim	L				C
Bolts			V		C

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Maintenance every 50 hours or 1 month

Periodicity	1 month 50 h	Date control	Date control	Date control	Date control
Wings, control surfaces and empennage fabrics					
Fork and landing gear					
Tyres Pressue (1.8)	v				
Tyres wear	v				
Brakes wear	v				
Front fork and main gear shok absorbers	v				
Windsreen					
Controls					
Ailerons cables	v				
Ailerons tubes and socket-joints	v				
Rudder cables	v				
Handle stick joint	L				
Elevator control	V				
Choke and throttle cables	V				
Flaps control	V				
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires					
Battery					
Fuel hoses	v				
Handle fuel pump	v				
Fuel filter	v				
Fuel tank					
Control surfaces, trim, mobile parts					
Axels	L				
Bellcrank / quick links	V				
Cable trim	L				
Bolts					

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Maintenance every 150 hours or 6 month

Periodicity	1 month 50 h	Date control	Date control	Date control	Date control
Wings, control surfaces and empennage fabrics					
Fork and landing gear					
Tyres Pressue (1.8)	v				
Tyres wear	v				
Brakes wear	v				
Front fork and main gear shok absorbers	v				
Windsreen					
Controls					
Ailerons cables	L				
Ailerons tubes and socket-joints	V				
Rudder cables	L				
Handle stick joint	V				
Elevator control	L				
Choke and throttle cables	L				
Flaps control	V				
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires	V				
Battery	V				
Fuel hoses	V				
Handle fuel pump	V				
Fuel filter	R				
Fuel tank	V				
Control surfaces, trim, mobile parts					
Axels	L				
Bellcrank / quick links	V				
Cable trim	L				
Bolts					

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Maintenance every 300 h or 1 year

Periodicity	1year 300 h	Date control	Date control	Date control	Date control
Wings, control surfaces and empennage fabrics	v				
Fork and landing gear					
Tyres Pressue (1.8)	v				
Tyres wear	v				
Brakes wear	v				
Front fork and main gear shok absorbers	v				
Windsreen					
Controls					
Ailerons cables	L				
Ailerons tubes and socket-joints	V				
Rudder cables	L				
Handle stick joint	V				
Elevator control	L				
Choke and throttle cables	L				
Flaps control	V				
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires	V				
Battery	V				
Fuel hoses	R				
Handle fuel pump	V				
Fuel filter	R				
Fuel tank	V				
Control surfaces, trim, mobile parts					
Axels	L				
Bellcrank / quick links	V				
Cable trim	L				
Bolts	V				

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Maintenance every 600 h or 2 years

Periodicity	2 years 600 h	Date control	Date control	Date control	Date control
Wings, control surfaces and empennage fabrics	v				
Fork and landing gear					
	v				
Tyres wear	v				
Brakes wear	v				
Front fork and main gear shok absorbers	v				
Windsreen					
Controls					
Ailerons cables	L				
Ailerons tubes and socket-joints	V				
Rudder cables	L				
Handle stick joint	L				
Elevator control	V				
Choke and throttle cables	L				
Flaps control	V				
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires	V				
Battery	V				
Fuel hoses	V				
Handle fuel pump	R				
Fuel filter	R				
Fuel tank	V				
Control surfaces, trim, mobile parts					
Axels	L				
Bellcrank / quick links	V				
Cable trim	L				
Bolts	V				

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Maintenance every 900 h or 5 years

Periodicity	5 years 900 h	Date control	Date control	Date control	Date control
Wings, control surfaces and empennage fabrics	C				
Fork and landing gear					
	v				
Tyres wear	v				
Brakes wear	v				
Front fork and main gear shok absorbers	v				
Windsreen	V				
Controls					
Ailerons cables	C				
Ailerons tubes and socket-joints	C				
Rudder cables	C				
Handle stick joint	C				
Elevator control	C				
Choke and throttle cables	C				
Flaps control	C				
Electric wiring and fuel line					
Take care of scrapping and wear					
Electric wires	V				
Battery	V				
Fuel hoses	R				
Handle fuel pump	R				
Fuel filter	R				
Fuel tank	V				
Control surfaces, trim, mobile parts					
Axels	C				
Bellcrank / quick links	C				
Cable trim	C				
Bolts	C				

Note: V = Verify and replace if necessary
R = Replace
L = Lubricate, verify and replace if necessary
C = Control by a computer professional and replace if necessary

8-3 Propeller

- Frequently wash the blades with soapy water
- Repair all the little cracks with epoxy resin and sand
- Torque of bolts: follow propeller manufacturer instructions

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Refer: BRP-Powertrain (MAINTENANCE MANUAL)

Jabiru Aircraft Pty Ltd	
Instruction & Maintenance Manual	**Jabiru 2200 Aircraft Engine Solid Valve Lifter Models**

6. CHECKS ON ENGINE & INSTALLATION

6.1 Daily Checks

* Ensure free movement of throttle & choke cables.

* Check Oil Level, replenish if necessary. Oil level should be between the MAX & MIN marks- but must never be below the MIN mark. Before long periods of operation, ensure that the level is at least at the mid position. Difference in the oil quantity between MAX & MIN mark is 0.5 litres (0.528 US Quarts). See section 6.3 for first 25 hours of Operation. Check oil level by screwing in cap fully before withdrawing. Overfilling is detrimental to the engine.

* Check security of spark plugs, leads & electrical connections.

* Check lubrication & fuel system for leaks.

* Check exhaust system for security & leaks.

* With ignition & Master OFF, and throttle closed, turn propeller by hand & observe engine for odd noises or heavy movements. Check for regular compression if irregular, firstly check tappet adjustment (see para 7.8).

IMPORTANT

Prior to pulling through the propeller by hand, both ignition circuits & the Master must be switched OFF, the brakes applied, throttle closed & the cockpit attended by a trained person.

WARNING

A hot engine may fire with the ignition/s switched OFF.

CAUTION

Continued operation with incorrectly adjusted tappets will result in damage to valves, valve seats, valve guides & overhead gear. Head torque and valve adjustment at 5/10 hrs from initial start up.

* *Prior to takeoff-follow the Starting & Warm Up procedure, observe the engine behaviour & throttle response.
* Check temperatures & pressures. Conduct a short ground test at full power (a few seconds) (consult aircraft Flight Manual).

NOTE:

Prolonged running at full power on the ground can cause engine overheating & damage unless special, oversized air ducts and oil coolers are used.

6.2 Periodic Checks

* After the initial 25 hours, check in accordance with para. 6.3
* After 50 hours of operation, check in accordance with para. 6.4 & thereafter after each 50 hours of operation.
* At TBO, overhaul in accordance with para. 6.7

6.3 Check after Initial 25 Hours

Details of specific operations are shown in Chapter 7" Maintenance".

- Remove engine cowlings, check engine mounts.
- Thoroughly check engine for missing or loose bolts, nuts, pins, etc., & fro abrasions.
- Check induction and exhaust flange for loose bolts.
- Check safety wires, cooling air ducts & baffles, ignition wiring & hose connections.
- Oil change 2.0 litres. Use normal aviation running oil.
- Change oil filter.
- Inspect old filter.
- Retorque cylinder head bolts (20 ft lbs) in diagonal pattern
- Check tappet clearance and adjust as necessary (refer Para 7.8). (0.010" cold inlet and exhaust)
- Check exhausts system, check exhaust cap screw tensions and gasket condition.
- Check fuel system for leaks & abrasion.
- Check wiring for damage & for tightness.
- Check prop bolt torque.
- Engine test run.

Observe starting, warm up & acceleration behaviour to maximum RPM (10 seconds max)

Check temperatures & pressures.

Engine stop.

6.4 50 Hours Check

Details of specific operations are shown in Chapter 7 “Maintenance”.

* Conduct the items shown under 25 Hour Check at para. 6.3. (Include oil and filter change)

6.5 100 Hours Check

Details of specific operations are shown in Chapter 7 “Maintenance”.

* Conduct the items shown under 25 Hour check at para. 6.3. (Include oil and filter change)

* Renew spark plugs, if necessary.

6.6 200 Hours Check

Details of specific operations are shown in Chapter 7 “Maintenance”.

* Treat as per 100 Hour check, with the addition of a flywheel bolt check.

6.7 TBO

Details of specific operations are shown in Chapter 7 “Maintenance”.

* Engine Overhaul, in accordance with Service Bulletins.

* Conduct the items shown under 25 Hour Check at para. 6.3.

* Check clearance on throttle valve shaft. If radial clearance exceeds 0.5mm (0.020”), repair carburettor.

* The overhaul work must be carried out to Jabiru specifications at an approved aeronautical service facility or by an approved Jabiru Service Centre.

* If necessary, changes to the TBO Limit due to operational experience, will be announced by Jabiru in a Service Bulletin.

Appendix `Q'
(refers to para 33 of SOP 01/2015)

DEFECT REPORTING AND INVESTIGATION: MICROLIGHTS

List of Annexures:

A: Format for Serious Defect Report
B: Format for Defect Report
C: Format for Defect Investigation Report
D: Format for Premature withdrawal of Rotable (PWR)

INTRODUCTION

1. All airborne equipment are designed to give a specific performance over a period of time. A degree of reliability is in-built in the equipment and a system of preventive maintenance is followed against deterioration/failure in performance. Despite this, failures/defects do occur during the service life of the equipment which result in malfunction or premature withdrawals of components causing unserviceability or unreliability of the system. In the interest of flight safety and to improve the serviceability and reliability, it is necessary that any such defect is immediately reported on appropriate form, investigated and prompt remedial measures instituted to prevent recurrence.

AIM

2. This SOP lays down the procedure to be followed for reporting and investigating defects and premature failures on all types of airborne equipment in use in the NCC.

DEALING WITH DEFECTS AND FAILURES

3. Whenever a defect or failure in equipment is noticed, preliminary investigation is to be carried out immediately at the unit level to determine the seriousness of the defect. Defects and failures occurring in the airborne equipment could be attributed to any or a combination of the following causes:

(a) Inadequate servicing/operating instructions.

(b) Imperfect workmanship in manufacture/overhaul (OH) at Manufacturing/ repair agency.

(c) Weakness in design.

(d) Faulty material.

(e) Corrosion, deterioration and/or excessive wear.

(f) Equipment having been operated beyond the design limits.

(g) Improper storage, when the equipment is not in use.

(h) Deterioration of sub-assemblies/components during usage.

(j) Environmental degradation.

4. **Serious Defects.** In case the defect or failure has resulted in an accident/incident, or if the defect is considered to have serious ramifications on flight safety, they are termed as Serious Defects. All serious defects and failures will be reported by signal/fax followed by written report on Defect Reporting Form IAFF (T)-1022. Defects and failures of following nature are considered serious:-

(a) Any defect, which in the opinion of the Court of Inquiry (CoI)/ Technical Investigation (TI), has led to a Cat I/II/III accidents.

(b) Any defect, which, has/could have led to a hazardous situation in the air.

(c) Any case of material failure, the cause of which cannot be determined/ ascertained at unit level.

5. **Defect Reporting Action At Unit.** In the event of detection of a serious defect, Commanding Officer of the user unit shall raise a Serious Defect Report as per the format placed at **Annexure 'A'**. Recommendations of the CO on the requirement of ordering a one-time check or any action in the interest of flight safety are to be included in the report. Lgs Air Cell at HQ DGNCC in consultation with Training Air cell/Manufacturer/Repair agency is to order a onetime check on the fleet if required. Defect reports are to be dispatched to concerned agencies by fastest means such as speed post, courier service, E-mail, Fax, etc. as feasible. Whenever electronic media is used, a confirmation copy is to be sent by post. Colour Photographs are also to be attached, wherever physical damage is visible. A soft copy should also be dispatched subsequently. Unit is to ensure the following:

(a) Check all relevant documents; collect information concerning the defect and raise Defect Report in the required format. Where necessary, photographs/sketches of the installation in the aircraft or system be attached with respective Performa placed as **Annexure 'B'**.

(b) In case of engine/ hydraulic components, collect half-litre sample of engine oil/hydraulic fluid in use on the aircraft from which the component is removed in a surgically clean, dry glass bottle, seal and send the sample to investigating agency along with the component.

(c) A Category 'Defect Investigation' (Cat' DI') label duly annotated with Defect Report (DR) registration number and signed by CO should also

accompany the defective component. Secure label properly to ensure that it is not lost in transit.

(d) No item should be cannibalized from it. The defective component must be complete in all respects.

(e) Defective aero engines must be fitted with all original items as were fitted at the time of failure and must otherwise be complete in all respects. Cannibalization of parts from such aero engines is not permitted.

(f) A photocopy of the Log book/Certificate is to be retained at unit, for record purpose. The defective item is to be packed in a separate packing case along with IAFF (T)-1022 and other related documents. The packing case is to be marked appropriately for easy identification and speedy movement of defective components to DI Agency. Components involved in accident/incident and where a COI/TI has been ordered are not to dispatched without prior concurrence of the Presiding Officer.

(g) Dispatch the defective item along with the issue vouchers (with annotation of details of DR in MTV) and the IAFF (T)-1022 to the DI agency under escort/courier as instructed by HQ DGNCC.

6. **Defect Register**. All defects and failures reported on IAFF(T)-1022 are to be recorded in a register and on computer. These records are to be maintained at the Unit. Registration numbers are to be given on yearly basis starting from 01 January. The DR Registration Number will be in sequence for both Serious Defects and Normal Defects. However, registers would be separate. Following information is to be recorded:

(a) DR Registration No

(b) Nomenclature of component

(c) Section/Ref_____ Pt No_____

(d) Aircraft No

(e) Aero engine No

(f) Time between overhaul (TBO) life/ Life since New/ Life since OH

(g) Nature of defect

(h) Date DR raised

(j) Dispatch Details (giving EX/IVNo , unit to which dispatched and name of DI agency)

(k) Case markings

(l) Mode of transportation

(m) Date component dispatched

(n) Defect Investigation Report (DIR) No (on reciept)

(o) Recommendation of DI agency

(p) Follow up action taken by the unit

7. **Action at Parent Directorate.** On receipt of Serious Defect Report from unit, Dte will consider seriousness of defect reported and intimate other units under its control operating similar equipment for initiating preventive measures wherever considered necessary. It will also scrutinize the defect report for correctness of information and monitor for prompt dispatch of defective component to DI agency.It shall monitor and investigate cases relating to delayed /incorrect despatch of items and initiate necessary action against those not adhering to laid down instructions/procedures. It shall also monitor findings/ recommendations of DI agency and ensure that remedial measures are implemented by all units concerned.

8. **Action at DGNCC.** On receipt of first information/fax Lgs Air cell at DGNCC is to take the following actions:

(a) In case of known defects, necessary instructions be issued to operating units to dispense with the defect reporting procedure.

(b) Wherever necessary, issue instructions to concerned units for inspection of entire stock of similar equipment in use or in storage for possible defects/shortcomings and obtain feedback on the defects/failures to ascertain the extent to which the fleet is affected.

(c) Communicate disposal instructions to affected units and Dtes.

(d) Liaise with DI agency and communicate to unit and Dte, the designated DI agency, dispatch instructions, mode of despatch, time frames for dispatch, documentation requirements and any other instruction considered relevant to the issue.

(e) Issue instructions to NCC Liaison cell for monitoring receipt of item, prompt loading of item for DI and timely completion of investigations.

9. **Action at Ncc Liaison Cell.** On receipt of advance copy of Defect report from units, the same is to be registered in a register opened specifically for this purpose. Subsequently on receipt of the component, the same is to be identified and inducted for investigation. NCC Liaison cell is to check and reconcile receipt of components and intimate non receipt of items by fax to parent Dte, Unit and Lgs Air Cell at HQ DGNCC. NCC Liaison cell is to ensure that all components received for DI/PWR are loaded on the DI agency for investigation/repair on priority. NCC Liaison Cell will assist investigating team and provide useful information for the investigation. It is to obtain requisite information from field units and provide it to the investigating team as and when required. Liaison Cell is to ensure that all items loaded for DI are returned in a Cat ‘B’ condition within a reasonable time frame. In case any item is

found to be 'Beyond Economical Repair', HQ DGNCC Lgs Air cell is to be immediately approached for necessary approval to declare the item Cat 'E' and further disposal.

10. **Action at Investigating Agency.** On receipt of defective item , a DI team is to be formed at the DI agency comprising of members from Production, Quality departments, NCC Liaison cell and member from Court of Inquiry (if applicable). The investigation is to be completed within 60 days of receipt at the DI agency. On completion of the investigation, DI agency is to render a detailed Defect Investigation Report in 05 copies as per the format given in **Annexure 'C'**.

11. **Action on DIRs.** On receipt of DIRs from Defect Investigation Agency, the Lgs Air Cell at HQ DGNCC is to study the DIRs and the recommended remedial measures. It is to forward copies of DIR to CSDO for effecting amendments in servicing schedules wherever necessary. It is to monitor and ensure implementation of remedial measures through the respective State Dtes.

12. **Reporting of Normal Defects/Premature Withdrawals.** Logistic Air Cell at DGNCC is to prepare a list of components which can be repaired at the repair agency and put back in service and also for which detailed repair facilities exist (Listed Items). These components are to assigned a unique serial number for proper identification and subsequent monitoring. These items are to be declared certificate items and proper component certificate/ log cards are to be prepared and maintained.

13. All cases of normal defects/ premature failures on 'Listed Items' which are not subjected to IAFF- 1022 action, are to be reported on Premature Withdrawal Report (PWR).

14. **Action at Units**: The following actions are to be taken in case of normal defects/premature withdrawals of Listed Components:

(a) Premature withdrawals of components meeting the criteria as per para 11 and 12 are to be reported on PWR Performa placed at **Annexure 'D'**.

(b) Inform Lgs Air Cell at HQ DGNCC and NCC Liaison cell by telephone/fax and update status on the Fleet Management software provided to units. Raise and process demand for unserviceable item as per laid down SOP.

(c) Collect all information regarding the defect and raise PWR as per format. Where necessary, photographs, sketches or other additional details be attached with the PWR. A categorisation label – Cat 'PW' annotated with PWR registration number and duly signed by CO should be properly secured to the component.

(d) Dispatch the defective component along with issue voucher and copy of PWR to the NCC Liaison cell, along with other unserviceable items once a quarter for further investigation/repair.

(e) A quarterly summary of Premature Withdrawal Reports is to be rendered by unit and forwarded to parent Dte, HQ DGNCC Lgs Air Cell and NCC Liaison Cell.

(f) All premature failures reported on PWR are to be recorded in a register as well as on computer. Separate registration numbers are to be given on yearly basis starting from 01 Jan. The format and information to be recorded is to be similar to that followed for DRs as given in Para 6 and by substituting the word DR with PWR wherever applicable.

15. **Action at Parent Directorate.** On receipt of quarterly summary of PWRs from units, concerned Dte to monitor Premature Withdrawal trend vis-à-vis availability of floats for such components and follow up procurement action as necessary. Concerned units are to be instructed wherever necessary on any discrepancy in data on PWRs or in case of PWRs gone missing.

16. **Action at HQ DGNCC.** On receipt of first information from unit, Lgs Air cell is to examine the nature of unserviceability and seek clarifications from unit wherever necessary. Necessary action is to be taken to requisition repair/assessment party from manufacturer wherever applicable. It is to check availability of item with NCC Liaison cell/Manufacturer and instruct unit to process demand expeditiously. In case item is readily available, it shall issue allocation orders to NCC Liaison cell for issue of item to unit following laid down procedures in the relevant SOP.

17. **Action at Liaison Cell.** On receipt of premature withdrawal items along with PWRs from units, they are to be inducted for normal repair with the repair agency. However during the course of normal repair, the repair agency will diagnose the defect in order to ascertain reasons for failure and reasons for failure are to be recorded and made available to NCC Liaison cell. Liaison Cell is to ensure that all items loaded for repair are returned in a Cat 'B' condition within a reasonable time frame. In case any item is found to be 'Beyond Economical Repair', HQ DGNCC Lgs Air cell is to be immediately approached for necessary approval to declare the item Cat 'E' and further disposal. On receipt of quarterly summary of PWRs from units, reconcile data and take action on non receipt of components through normal laid down channels.

18. This SOP is applicable with immediate effect.

19. Any deviation to this procedure will be under the instructions of DDG (Lgs) only.

20. This has the approval of DG NCC.

Annexure 'A'
(Refers to Para 5 of the SOP on Defect Reporting and Investigation)

SERIOUS DEFECT REPORT
(To be raised by Unit)

Layout

1. Type of Aircraft
2. Aircraft No.
3. Aero Engine No.(When aero engine/aero engine rotables are involved)
4. Nomenclature of Defective Component
5. Section Reference No.
6. Serial No. of the component
7. Hrs flown since new
8. Hrs flown since overhaul
9. Main system / Sub system
10. Details of defects including symptoms of failure
11. Date defect occurred
12. Effect of failure
13. State whether the item is under warranty or not
14. Whether defect can be rectified with unit resources
15. If yes, detailed action and estimated man-hours
16. Recommendation of CO

Distribution:

1. HQ DG NCC (JD Lgs Air).
2. Concerned Dte.
3. Concerned GP HQ.
4. NCC Liaison Cell.

QUARTERELY STATUS ON DEFECT REPORT

(To be raised by NCC LIAISON CELL)

Type of A/C	IAFF(T)-1022 Ref No	Particulars of Defective items	Repair Agency	Date of Dispatch	Date of Receipt at NCC LIAISON CELL	Date of Loading For DI

Distribution:

1. JD Lgs(Air)
2. Concerned Dte
3. Concerned GP HQ
4. Unit
5. File

Annexure 'B'
(Refers to Para 5 of the SOP on Defect Reporting and Investigation)

DEFECT REPORT

PART -1(F-1241 Reference as per……..) Date of Occurrence of Incident: DR No:(Unit/Type of ac/DR/SI No……/Calendar YearP Aircraft No: Date when DR raised:
PART-II (Details of defective component) Vocab No: Part No: Trade: Nomenclature: TBO: Component SI No: Life completed since O/H: System: Main Assembly: SL No.(if applicable): Signature: SNCO I/C:

PART-III (Defect Particulars)

Symptoms……
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……
……

Checks/Rectification done at Unit Level
……
……
……
……

Probable Cause of defect (Whenever feasible)

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……
……
……

Date: Signature CO

PART-IV (Dispatch Details) Consignee:

DI Agency:

EX/IV No & Date:

Mode of conveyance: Date of Dispatch:

Date: Signature CO

Distribution:

1. HQ DG NCC (JD Lgs(Air)
2. Concerned Dte
3. Concerned GP HQ
4. NCC Liaison Cell (Advance Copy)
5. DI Agency with Component.

Annexure 'C'
(Refers to Para 10 of the SOP on Defect Reporting and Investigation)

DEFECT INVESTIGATION REPORT
(To be raised by DI Agency)

PART -1 Date of Occurrence: DIR No: Date: DR /Ref No: Date: F-1241 Ref: Date:
PART-III (Details of defective component) Sec Ref/Vocab No: Life completed since new: Part No: Trade: Nomenclature: TBO: Component SI No: Life completed since O/H: System : Main Assembly: SL No. (If applicable):

PART-III (Brief Particulars of Defect)

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……

PART –IV (Investigation)

Detail of
Examination……..
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Findings/Conclusion……
……
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……
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Remedial
measures……
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……
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……
……

Suggested Implementation Agency: ……

Attributability Code: (Tick any one or more as applicable)

U	R	D	F	N	C	N

Authorized Signatory of

DI Agency

Authorized Signatoy of

NCC Rep
Date:

PART-V

Remarks by RCMA/RTO(as applicable)

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(Design aspect)

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Signature: Date:

PART – VI

Remarks by CRI/CQA (as applicable)

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……..

Signature: Date:

Distribution:

1. HQ DG NCC (JD Lgs(Air)
2. Concerned Dte
3. Concerned GP HQ
4. NCC Liaison Cell (Advance Copy)
5. UNIT

Attributability Codes:

U-Lapses on the part of users
R- Lapses on the part of repair agency/Manufacturers
D-Due to features inherent in the design
F-Failure due to ageing, Corrosion, Material failure etc.
N-Defect not established
C-Defect cause not established
M-Other reasons (Misc)

Annexure 'D'
(Refers to Para 14 (a) of the SOP on Defect Reporting and Investigation)

PREMATURE WITHDRAWAL REPORT(PWR)

(To be raised by the Unit)

PART-V

PWR No: (Unit/Type of ac/PWR/SI.No……./Calendar year)

Air craft No: Date:

PART-II (Detail of Faulty component)

SI . No. (If applicable):

Vocab No:

Life completed since new:

Part No:

Trade:

Nomenclature:

TBO:

Component SI. No:

Life completed since O/H:

System

Main Assembly:

Date: Signature of SNCO I/C

PART –III (Details of Failure /Trouble shooting)

……
……
……
……
……

Date : Signature of CO

PART-IV(Dispatch Details)

Consignee:

EX/IV No & Date :

Mode of conveyance:

Date of Dispatch:

Date: Signature of CO

Distribution:

1. HQ DG NCC (JD Lgs(Air)
2. Concerned Dte
3. Concerned GP HQ
4. NCC Liaison Cell (Advance Copy)
5. DI Agency with Component.