

RAAP 12

AIRCRAFT MAINTENANCE LOGBOOK COMPLETION

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Aircraft Maintenance Log

RAAus produces a maintenance logbook which is available to members at a reasonable cost. However, it is not mandatory to use the RAAus Aircraft Maintenance Logbook. You can make up your own maintenance logbook but if you do, it should be in a format similar to the RAAus model.

There are five parts to the recording of an aircraft's maintenance:

The four parts of the Aircraft maintenance Log, i.e.

Part 1 - The aircraft identification and specifications,

Part 2 - The maintenance record,

Part 3 – The modifications and components record together with the summary of empty weight changes,

Part 4 – The record of airworthiness directives/notices checklist

The fifth part, which is considered a part of maintenance records, is the Daily Flight Record. As noted in the Technical manual, the DFR “may aid in identifying maintenance concerns”. TO BE REPLACED BY THE HAM(Hours and Maintenance Record)

Part 1 of the logbook is fairly straightforward

Aircraft ID – The aircraft's Registration Number

Manufacturer – The aircraft or kit manufacturer's name. If the aircraft was designed and built by you then you would be the manufacturer. If built from plans, then the designer and you as builder

Model – The model designated by the manufacturer, the model designated by the designer or you as the designer/builder.

Serial Number – as designated by the manufacturer or you as the designer/builder. If from plans, the set number of the plans.

Registration Number – The aircraft's Registration Number

First Registered – The date when the aircraft is fully registered, i.e. after the test flight period has been finalised.

Specifications

Aircraft Compliance: CAO - This will be either 95.10, 95.32 or 95.55

Number of Seats – Either One or Two, any more should be removed, permanently!!

Aircraft Datum Point – The point specified by the manufacturer or designer where all measurements are taken for the calculation of Weight and Balance of the aircraft.

Basic Aircraft Empty Weight – This weight is the empty weight calculated at the Weight and Balance, NOT the empty weight specified by the kit manufacturer or the designer. Factory built aircraft will have this weight specified in its documentation but this figure will need to be re-calculated with any modifications or the addition/ removal of equipment.

Aircraft Centre of Gravity (CoG) - The centre of gravity is the centre of gravity calculated at the Weight and Balance, NOT the centre of gravity specified by the kit manufacturer or the designer. Factory built aircraft will have this point specified in its documentation but this location will need to be re-calculated with any modifications or the addition/ removal of equipment.

Registered Owners

Owner, Name, Address, Date Purchased – Self-explanatory, the names and addresses of previous owners as well as the current owner/s.

Components

Engine – Manufacturer and Serial Number

Propeller – Manufacturer / Type / Serial Number

Gear Drive – Manufacturer / Type and/or ratio

Carburation – Manufacturer / Number / Type

Start System – Electric / Pulley / Other

Fuel Capacity – Litres / Number of tanks / Location of tanks e.g. wings, fuselage, firewall, etc.

Brakes – Yes/No / Type

Radio – Yes/No / Manufacturer / Type / Serial Number

Intercom – Yes/No / Manufacturer / Type / Serial Number

Instruments – List basic instruments, i.e. appropriate engine instruments, Airspeed indicator, Altimeter, magnetic compass plus additional installed instruments.

Colour

Fuselage – Primary and secondary colours

Wings - Primary and secondary colours

Tail -Primary and secondary colours

In addition to the information to be noted in Part 1, there are additional statements to be included for Amateur Built Aircraft. These are:

An Introductory Statement

"I hereby certify that the Amateur Built aircraft registered number 19-2101 identified as a Skyranger V Fun with serial number 09-451, has been manufactured in accordance with good aeronautical practices and complies with the drawings, instructions and specifications supplied as a kit/~~plans set~~ number 09-451 "

Construction commenced 14/3/2009 and was completed on 30/11/2009

Builder Name Bob Blue.

Signed R. U. Blue RAAus 015575

Date 14/12/2009

A Chosen Maintenance Program:

Each aircraft must have a maintenance program identified.

A list of **Airworthiness Notices, Service Bulletins, Service Letter, etc.** compliances.

A list of all the specific items identified as applicable to your aircraft and that they have, to date, been complied with.

A statement of Engine Fitment

Engine installation carried out in accordance with the relevant construction manuals, drawings and using good aeronautical practices.

MAKE Rotax MODEL 912UL

SERIAL NUMBER 4406532 NEW MANUFACTURED DATE 5/9/2008

TSN _____ If part life: TSO Nil

Signed R.U. Blue Date 14/12/2009

Inspection of cable operated control systems carried out for correct installation, full and free travel, correct sense and the locking of systems.

Initial inspection by Eob Blue

Signed R.U. Blue RAAus 015575 Date 1/12/2009

Independent inspection by Ian Green

Signed I M Green RAAus 015082 Date 2/12/2009

A statement regarding the Propeller Fitment

Propeller installation carried out using the prescribed manuals, drawings and using good aeronautical practices, IAW

MAKE Kiev MODEL ??

SERIAL NUMBER 263/1700 MFG DATE 11/11/2008

T.S.N. _____ If Part Life – T.S.O. _____

Signed R. U. Blue RAAUs 015575 Date 2/12/2009

A Compass Calibration (carried out in accordance with (CASA Airworthiness Bulletin 34-008)

At Tumbarumba on 1/12/2009

Results

030	060	090	120	150	180	210	240	270	300	330	360
<u>029</u>	<u>061</u>	<u>092</u>	<u>121</u>	<u>150</u>	<u>179</u>	<u>210</u>	<u>242</u>	<u>271</u>	<u>300</u>	<u>331</u>	<u>361</u>

A statement regarding the aircraft **Harnesses**

Safety harnesses fitted in accordance with the appropriate aircraft construction manual, drawings and good aeronautical practices.

Make DS Harness Co Model UL 3P
Serial Number 3P-0410E
Signed R.U. Blue RAAus 015575 Date 1/12/2009

The location of the A/c **Weight and Balance**

Aircraft weight and balance carried out IAW Technical Manual Section 10.

The full reports are located in Top drawer, 4 drawer cabinet in hangar office marked "Aircraft details"

Signed R. U. Blue RAAus 015575 Date 1/12/2009

Details of the **Fuel System**

Fuel quantity calibrations. One chart require for each tank.

Name of this tank: Left Tank / Right Tank

Total capacity of this tank, including unusable fuel is 40 / 40 litres.

Quantity of unusable fuel in this tank when the gauge reads ZERO or EMPTY is 0 - 0 litres

Major graduations on gauge	10	20	30	-	-	-	-	-
Measured quantity of useable fuel (litres)	10	20	30	-	-	-	-	-

Signed R. U. Blue RAAus 015575 Date 1/12/2009

Details of the aircraft **Electrical System**

Electrical system installation carried out in accordance with the appropriate aircraft construction manuals, drawings, FAA AC 43-13-1B chapter 11 and good aeronautical practices.

A copy of the aircraft circuit diagram is located in: Top drawer, 4 drawer cabinet in hangar office marked "Aircraft details".

Signed R. U. Blue RAAus 015575 Date 1/12/2009

The result of the **Flight Controls Inspection**

PORT AILERON	UP	<i>15 degrees</i>	DOWN	<i>18 degrees</i>
STBD AILERON	UP	<i>16 degrees</i>	DOWN	<i>18 degrees</i>
PORT FLAP	UP	<i>0 degrees</i>	DOWN	<i>35 degrees</i>
STBD FLAP	UP	<i>0 degrees</i>	DOWN	<i>35 degrees</i>
PORT ELEVATOR	UP	<i>23 degrees</i>	DOWN	<i>19 degrees</i>
STBD ELEVATOR	UP	<i>23 degrees</i>	DOWN	<i>19 degrees</i>
RUDDER	LEFT	<i>26 degrees</i>	RIGHT	<i>24 degrees</i>

Details of these statements can be found in the Technical manual at Section 12.5-6 & 7.

You will note on the back of Part 1 there are some explanatory notes – these apply to some of the columns you will find in Part 2. These are:

Time – Hours and minutes of the aircraft operation and the operation which, of course, can be different.

ttis – Total time in service (sometimes shown as *tsn* – time since new)

tsm – Time since maintenance

tso – Time since overhaul

Part 2

We now get down to the nitty-gritty of the Logbook – the Maintenance Record!

You will note that it is basically broken down into two parts, the record of maintenance on the airframe and the engine maintenance.

The first thing to remember is that you do not have to cram any information regarding any inspection or completed maintenance on one line of the record. Take as much space as you need to fully record the details of the inspection and/or the maintenance carried out. It may pay dividends in the future.

Now to get back to the main two sections of the record. It has been suggested that if you imagine an engine being disconnected and lifted out of an aircraft then all the bits attached to engine, e.g. spark plugs, oil filter/s, starter motor, generator/alternator, etc., are recorded under the heading of “Engine” while all the rest can be regarded as airframe, e.g. battery, external fuel pump/s, fuel tank/s, instruments including engine instruments, it may, or may not include oil cooler/s, radiators – we’ll leave that decision up to you.

Let’s look at some airframe entries

The replacement/repair/overhaul (R-R-O) of a rough running external fuel pump would, of course, show the date of the pump R-R-O and the total time the aircraft had been in service at the time of the R-R-O. Because the R-R-O was not part of a maintenance program there is no need for an entry under *tsm* (time since maintenance).

Under the heading of “Maint. Type”, you would either show “Repl.”, “Repair”, or “O/haul”.

Under the heading of “Inspection and Maintenance Completed” you would provide as much relevant details as possible: e.g “External fuel pump running roughly, replaced by new pump, Fuel-Flo, model X10, serial no. X10-328765, tested OK” or “External fuel pump running roughly, fuel pump disassembled, faulty diaphragm found, replaced and re-installed, tested OK.” or “External fuel pump running roughly, fuel pump disassembled, cleaned, re-installed tested OK”.

In addition you should show your name, the date, your signature, your RAAus number, eg.

“Max MacDonald, 4/7/2016, *M. G. MacDonald*, RAAus 015575” and the authority under which this work was carried out, eg “RAAus Level 1 Maintainer”.

Airframe				
Date	<u>ttis</u>		<u>tsm</u>	
	hr	min	hr	min
4/7/16	347	48	-	-

<u>Maint.</u> Type	Inspection and Maintenance Completed
<u>Repl</u>	External fuel pump running roughly, replaced by new pump, Fuel-Flo, model X10, serial no. X10-328765, tested OK. Max MacDonald, 4/7/2016, M. G. MacDonald , RAAus 015575. RAAus Level 1 Maintainer

Airframe				
Date	<u>ttis</u>		<u>tsm</u>	
	hr	min	hr	min
4/7/16	347	48	-	-

<u>Maint.</u> Type	Inspection and Maintenance Completed
Repair	External fuel pump running roughly, fuel pump disassembled, faulty diaphragm found, replaced and re-installed, tested OK. Max MacDonald, 4/7/2016, M. G. MacDonald , RAAus 015575. RAAus Level 1 Maintainer

Airframe				
Date	<u>ttis</u>		<u>tsm</u>	
	hr	min	hr	min
4/7/16	347	48	-	-

<u>Maint.</u> Type	Inspection and Maintenance Completed
O/haul	External fuel pump running roughly, fuel pump disassembled, cleaned, re-installed tested OK. Max MacDonald, 4/7/2016, M. G. MacDonald , RAAus 015575. RAAus Level 1 Maintainer

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Another example of an entry under the heading of “Airframe” is the biennial instrument check (Tech Manual 12.4.2). Here we will need to note the time since the last instrument check was carried out.

	Airframe				Maint. Type	Inspection and Maintenance Completed
Date	ttis		tsm			
	hr	min	hr	min		
5/8/16	363	24	294	18	24 Month Check	Biennial check of instruments. Altimeter, AIS checked to GPS. Pitot/Static systems pressure tested – pressure held 4 ½ minutes. Compass swung, Deviation card amended. Fuel gauges checked OK. EPIRB battery date checked OK. Max MacDonald, 5/8/2016, M. G. MacDonald , RAAus 015575. RAAus Level 1 Maintainer

Now let's try some engine entries.

Your starter motor is playing up so you,

- (a) Replace it – beyond repair
- (b) Repair it – loose terminal found
- (c) Overhaul it – needs a clean and brushes replaced

Note: This is not part of any regular maintenance

(a)

Date	Engine				Maint. Type	Inspection and Maintenance Completed
	ttis		tsm			
	hr	min	hr	min		
26/11/16	374	42	-	-	Repl.	Starter motor engages intermittently. Replaced with new motor, Delco , model D47-2, serial ST 4816. Tested all OK. Max MacDonald, 26/11/ 2016 , M. G. MacDonald , RAAus 015575. RAAus Level 1 Maintainer

(b)

	Engine				Maint. Type	Inspection and Maintenance Completed
Date	tts		tsm			
	hr	min	hr	min		
26/11/16	374	42	-	-	Repair	Starter motor engages intermittently. Motor removed, disassembled, loose terminal found and tightened, re-installed, tested OK. Max MacDonald, 26/11/2016 M. G. MacDonald, RAAus 015575. RAAus Level 1 Maintainer

(c)

	Engine				Maint. Type	Inspection and Maintenance Completed
Date	ttis		tsm			
	hr	min	hr	min		
26/11/16	374	42	-	-	O/haul	Starter motor engages intermittently. Motor removed, disassembled, cleaned, brushes replaced, re-installed, tested OK. Max MacDonald, 26/11/2016 M. G. MacDonald, RAAus 015575. RAAus Level 1 Maintainer

And now the recording of some routine maintenance.

The maintenance Schedule for your aircraft requires that spark plugs be replaced every 50 hours and the oil and oil filter be changed every 100 hours.

	Engine				Maint. Type	Inspection and Maintenance Completed
Date	ttis		tsm			
	hr	min	hr	min		
2/12/16	376	36	98	54	Sched. Maint.	Replace spark plugs, replace oil and oil filter. 8 new NGK D9EA spark plugs fitted, New oil filter installed – old filter opened and found to be clean. Used 4.1 litres Aeroshell Sport Plus 4. Max MacDonald, 02/12/2016 M. G. MacDonald, RAAus 015575. RAAus Level 1 Maintainer

Part 3

We will now go to Part 3 of the Maintenance Logbook.

The purpose of this part is to record any change of weight in the aircraft either added to or subtracted from. Any change, of course, will affect the Centre of Gravity of our aircraft and will, in most cases, require a new Weight and Balance.

Unless you are qualified or approved to carry out Weight and balance checks then Part 3 of your Aircraft Maintenance Log book will be completed by a person who holds a CASA Weight Control Authority or a RAAus L2 or L4 who is a qualified weigher.

As Part 3 maintains a running total of the Empty Weight the first entry will be taken from the W & B supplied by the manufacturer or the first W & B record for a newly built/assembled aircraft.

The first piece of information to be recorded is the Datum point for the aircraft. This will be a reference point specified by the manufacturer, kit builder or the designer.

Examples are:

Back face of the propeller, a certain distance forward of a point on the aircraft e.g. the tip of the spinner, the firewall, the centre of the nose wheel etc.

Datum *Back face of propeller* _____.

Date	Description of Alteration	Moment arm from Datum mm	Weight & Balance Change				Running Total Empty Weight		
			Added Weight (+)		Added Weight (-)		Weight Kg	Arm mm	Index
			Weight	Index	Weight	Index			
2/2/14	Initial W & B	-	-	-	-	-	262	1365.79	357838.0
5/5/16	Replace Nose wheel	400	2	800	-	-	264	1358.48	358638.0
14/1/17	Fit lightweight battery	450			5	2250	259	1376.02	356388.0

Further information is:

Date: The date the weight change took place. (If you have trouble working out what goes in this column, sell your aircraft and take up bowls!)

Description: The reason why the weight has changed

Moment arm from Datum – mm: The distance, usually in millimetres but can be inches, from the datum to the point at which the weight changed.

Weight and Balance Change:

Added Weight (+) or (-)

Weight: The weight of the component, et al, that has been installed, removed or moved.

Index: The above weight multiplied by the distance between the Datum and the point at which the weight changed (Column 3).

Running Total Empty Weight

Weight Kg: This is a running total of the empty weight of the aircraft as a result of any change in weight.

Arm mm: This is the new Centre of Gravity (CoG) point from the Datum as a result of the weight change calculated by dividing the new Index by the new Weight.

Index: This figure is the previous index plus or minus the new index calculated for the change in weight.

Once you have completed these entries, do a mental check on the movement of the CoG, e.g. if the weight is increased forward of the previous CoG then the CoG should move forward. Conversely, if the weight is decreased forward of the previous CoG, the CoG will move back.

Or, if the weight is increased behind the previous CoG then the Cog will move back or forward if the weight is decreased behind the old CoG.

Part 4

The purpose of Part 4 of the Maintenance Log book is to record all Airworthiness Directives (AD's)/Notices in respect of a particular aircraft and, where applicable, those directives/notices have been actioned.

As noted in our Technical Manual, “An Airworthiness Notice is a notice issued by the Technical manager to RAAus aircraft owners/operators and other interested persons advising them of a known defect or deficiency and rectification action.”

The origin of these notices can be any number of sources. They may be as a result of defects noted by RAAus members or notices issued by airframe, instrument and engine manufacturers, kit suppliers, CASA or a National Airworthiness Authority (NAA) of an overseas country.

Airworthiness Directive		Subject	Applicable Yes/No	Compliance Period	No Longer Applicable	Reason (where applicability has ceased)
No.	Date					
Bt/1	14/3/15	Bending of rudder pedals. Pedals inspected, no evidence of bending. Check every 100 hourly.	Yes	All models before Ser. No. 041/99	-	-
Bt/2	4/6/10	Nose wheel main bolt. Crack found.	Yes	Ongoing	Yes	Bolt replaced as per AD.
Bt/3	11/1/11	Wing attachment bolts.	Yes	Before 2000 hours. Over 2000 hours – next 100 hourly	No	Bolts to be replaced next 100 hourly.

That's a WRAP!