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From: Francis Donaldson

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EUROPA MOTORGLIDER G-CBHI VISIT 14.1.4

Following the visit by Andy and myself to see G-CBHI at Chilbolton, I am writing to record the status of the motorglider project and outstanding issues for the approval of the mod on G-CBHI and for the type acceptance of the motorglider for the benefit of follow-on owners / builders.

As regards the overall type-acceptance programme this can be summarised as follows:

Classification	See item 1 below
51% rule	Accepted satisfactory
Design	Accepted satisfactory except see items 2,3,4,12,15,16 below
Structural reports	Accepted satisfactory except see item 17 below
Flight Handling (including spinning)	Accepted satisfactory except see para 2 and 16 below
Performance	Accepted satisfactory except see paras 9 and 10 below
Build Manual	Accepted satisfactory except see paras 5,6 and 13 below
Operators Manual	Outstanding – see para 14 below - action Swift
LAA AAN	Outstanding – action LAA Engineering
LAA TADS update	Outstanding – action LAA Engineering

Detailed issues are as follows:

1. Category. The question has never really arisen before of how an aircraft can be categorized as an aeroplane or a motorglider depending on which pair of wings is fitted to a single fuselage. In other words, on the UK register there is no facility for an aircraft to be dual-category. This is not really an issue for G-CBHI because Ian only intends to operate it with the long wings in future, but presumably the appeal of the whole project is that an owner can choose his wings for the mission of the particular day. For the present, the options are:
 - Change the aircraft classification for G-CBHI to motor glider which would prevent it flying on short wings. The aircraft could then only be flown by SLMG licensed / rated pilots and time flown on it would not count toward maintaining an SEP license.
 - Keep the classification as aeroplane and the Permit could then refer to long and short wings. The aeroplane could then only be flown by SEP aeroplane pilots, and time logged on it would not count towards keeping an SLMG rating. This option is perhaps

more consistent with the fact that even with the long wings, in flight test the aircraft did not apparently meet the max allowable min sink rate requirement of CS-22 for a motorglider. For G-CBHI Ian seemed happy to choose this option.

2. Lack of pre-stall warning. We do not think there is justification for not requiring a stall warner on the long wings. Ian was happy to develop and fit a suitable stall warner based on that in the short XS wings. This would need to be accepted before the long-wing mod can be cleared on G-CBHI. See applicable requirements in CS-VLA or CS-22 as appropriate.
3. Lack of undercarriage up warning. We do not think there is justification for not requiring a wheels-up warning system to be fitted, especially given the difficulty in raising the aircraft off the ground after a wheels-up landing. Ian seemed happy to develop and fit a suitable system using microswitches, buzzer/horn etc. which we suggest should be triggered by airbrake unlatching. This would need to be accepted by LAA before the long-wing mod could be cleared on G-CBHI.
4. The marking of the ASI red lines, cautionary arcs etc on G-CBHI was not considered acceptable because of the potential for confusion between the different values for the short and long wings. For G-CBHI this would be straightforward as with long wings only to be used, the ASI should simply be marked up straightforwardly with the long wing markings and the short wing markings deleted. Further proposal required for acceptance of 'convertible' examples though.
5. Trim position indicator. Although there was scope for this to be hidden by the airbrake lever as the trim indicator was positioned on G-CBHI, this was considered adequate on G-CBHI given that the only time this has to be looked at is normally before take-off. For future examples the manual should give guidance on optimum positioning of the trim position indicator for long-wing examples.
6. Undercarriage bungees. The tension had been adjusted and was now considered satisfactory. For future long wing or convertible aircraft, the manual needs to include advice about how to set the bungee tension to suit the two different configurations.
7. The empty weight and cg of G-CBHI is not well defined, with widely conflicting figures. A trustworthy weight schedule will be required before the long wing mod can be cleared on this aircraft. Ian agreed that he was happy to have the aircraft carefully reweighed to establish proper up to date data and present a new weight schedule to LAA. This will reveal the actual payload of the aircraft and in particular, scope for carrying more than one occupant with the long wings. LAA normal practice for a modern homebuilt two seater is for the payload to be sufficient to be to carry at least 2 x 86 Kg crew plus enough fuel for at least 1 hours flight at a fuel consumption corresponding with a fast cruise.
8. It is noted that the loaded cg range for the long wing version is more restricted than the short wing version. This needs to be stressed on the weight schedule. Ivan Shaw in the conclusions of his flight test report mentioned that handling-wise there may be scope for lessening the

difference between the two ranges or possibly making them the same, this would need to be explored by further flight test if to be pursued.

9. It was noted that the power-off sink rate measured during Ivan Shaw's flight test did not meet the CS-22 motorglider requirement of CS-22 para 71. If the aircraft is to be categorised as a motorglider it would need to be placarded in the cockpit to state this to be the case.
10. It is noted from the flight test report that the airbrakes apparently do not limit the airspeed in a dive to the degree required by CS-22 para 73 (b) for motorgliders, so they would not provide the normal degree of safety in the event of loss of control particularly in cloud. This is only considered acceptable on the basis that cloud flying is not to be permitted in the aircraft. Whether to be classified as a motorglider or not, a placard needs to be fitted warning of the ineffectiveness of the airbrakes and prohibition on cloud flying.
11. It is noted that G-CBHI has been fitted with Berringer brakes under LAA mod 13586. The installation appears to be wholly satisfactory with stick-mounted hand brake lever. Evaluation of standard brake arrangement for future examples required when layout defined.
12. It is noted that G-CBHI has been fitted with an oil thermostat to help with quick warm-up after re-start, this is acceptable, will this be part of the standard specification for future long-wing examples ?
13. Build manual. Items that need to be addressed or integrated are:
 - The build manual appears not to contain any instructions for putting together and fitting the outriggers or the wing tips.
 - Instructions for setting up aileron and airbrake travels need to be included.
 - Reference is made to the procedure for aligning the pivot bolts for the aileron quick connect bellcranks (last para on page 8-11) but not where this is to be found - see page 27-16 of the XS manual, step 18. Note that this needs to be done before the root fairings are installed.
 - Two illustrations are missing at the end of chapters 27a and 27b.
 - The wing forward pin's socket is still shown as the solid aluminium version, whereas the spherical bearing type as described in Mod 78 are required to be installed.
 - It is understood that the airbrake torque tube fouls the port rudder cable.
 - The wing root fairings installation section in chapter 8 should be removed - this procedure is shown correctly in chapter 27.
14. Owner's manual. Is it intended to provide a separate owner's manual for the motorglider or will a supplement be produced for insertion into the existing aeroplane owner's manuals? Please provide a copy for review.
15. We note that G-CBHI is fitted with a wing tip mounted wheel in addition to the normal outriggers, the idea being to allow operation with the outriggers removed if desired, to reduce drag. There seems a high risk of the aileron tip being damaged if the aileron is lowered on the wing with the tip wheel on the ground. What are the intentions for the tip

wheel arrangement on G-CBHI and future examples ? We have the mod down as being on hold pending further development/study so until properly authorised presumably this feature needs to be removed ?

16. My letter of 3.3.11 referred to the max airspeed with undercarriage lowered, V_{LO} not being defined. Has this now been set the same as V_{ne} or is it a reduced figure ?

17. My letter to Dave (Stanbridge) of 3.3.11 referred to RF's less than unity being quoted in EURO/023/STR without qualification or justification for LAA accepting what on first sight is an understrength situation, with an action on Europa to send an amendment dealing with these points. As my letter intimated, I don't think it would be difficult to deal with this issue but it needs to be done, as far as I am aware this point has not been addressed.

To summarise the actions required for gaining a Permit on G-CBHI, as compared with those required for type acceptance of the long wing / motorglider option as a whole, the following table refers to the points raised above and applicability to the two tasks.

Item	1	2	3	4	5	6	7	8	9
Required to clear mod on G-CBHI	No if it stays SEP	yes	yes	Long wing marks only	no	no	yes	no	no
Required for type acceptance to be completed	Yes if SLMG option needed	yes	yes	yes	yes	yes	no	no	yes

Item	10	11	12	13	14	15	16	17
Required to clear mod on G-CBHI	yes	no	no	no	Yes (at least in draft)	yes	yes	yes
Required for type acceptance to be completed	yes	yes	yes	yes	yes	no	yes	yes

I hope this helps complete the dual requirements of clearing G-CBHI and completing the motor glider type acceptance programme overall.

Francis Donaldson