

RotorSport UK Ltd

Service Repair Request and Evaluation/Approval

<p>This form (Part 2 of 2) is the response from RotorSport UK Ltd to a Service Repair and Evaluation/Approval request, which specifies the company authorised repair method. Deviation from this method renders the authorisation ineffective. Upon completion of the repair the repairer must enter details into the logbook/worksheet with the repair number and sign as normal. If any problems with carrying out the work authorised, contact RSUK immediately on +44(0)1588 650769, or email gerry@rotorsport.org.</p>		
Repair No. and Issue:	CCAR No.: None	Repair classification:
SRA-017 Iss1	Mod approval No: MC-246	MAJOR or
Aircraft type:	Aircraft serial No. OPEN	MINOR
Calidus	RSUK/CLDS/any First application: RSUK/CALS/015	
Repair problem description & cause of problem if known		
<p>G-CGMD suffered damage during a take off incident.</p> <p>Repairable damage was sustained by the enclosure (split in the composite at nose, delamination of inner skin, cracks in area of nose-wheel mounting, surface scratches to paintwork. Repairable damage was also sustained by the metal airframe in that the vertical mast section was bent approximately 10mm laterally out-of-position.</p> <p>This SRA demonstrates the method to repair these two damages.</p>		
Limitations on implementation		
The repair may only be carried-out by RotorSport UK Ltd		
Approval statement.		
The technical content of this document is approved under the authority of the UK CAA Design Organisation Approval Ref: DAI/9917/06.		
Tooling required.		
No standard tooling required, special fabrication and hydraulic equipment noted below		
Weight and balance.		
Not affected		
Manuals affected.		
Calidus POH RSUK0060 and AMM RSUK0061 are not affected		
Previous modifications affecting this SRA.		
None		
List of materials required to complete this SRA:		
Resin – Larit L-135 and Hardener - Larit L-137. (The above mixed in the ratio 700:245 by weight) Glass fibre and Carbon fibre – as required by identification from data described below Small quantity of original paint finish		
List of components required to complete this SRA:		
Other than replacement of nyloc nuts and any fasteners found corroded no new parts are required for		

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the SRA content itself.

Interchangeability:

Not affected

Parts disposition:

Dispose of all waste composite and damaged parts in normal industrial waste.

Accomplishment instructions/details of the repair/reference to other documentation:

(i) Introduction

Repair of the aircraft is conducted by means of two distinct activities:

- Mast straightening
- Composite repairs (enclosure and cowlings)

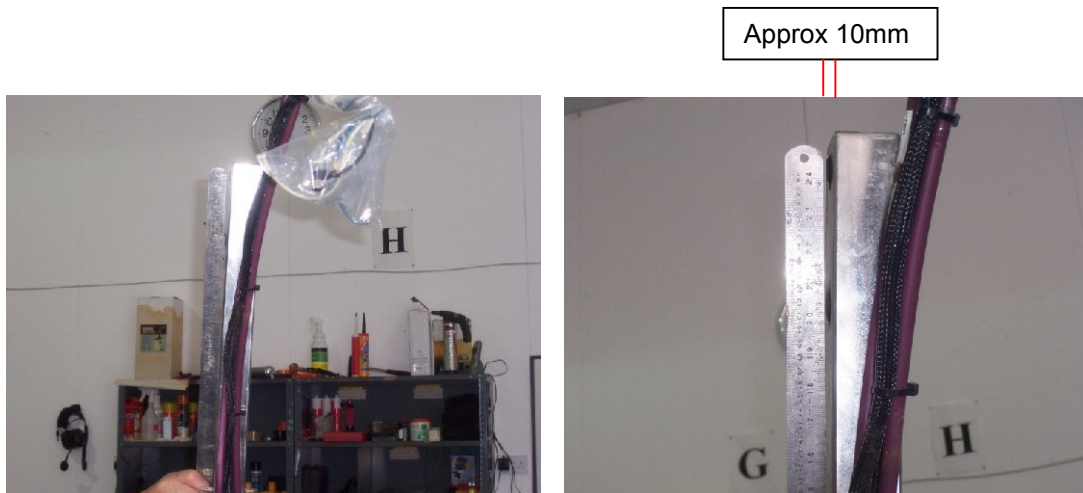
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(ii) Mast straightening

The mast is jig straightened using hydraulics. Correct straightness is measured using straight edges between the upper and lower sections of the mast, and twist by clamping a straight edge on the upper mast and visually aligning with the keel.

The photographs below show the bent state of the mast and the re-bend method as used on a different aircraft



Extent of bend shown at top of mast



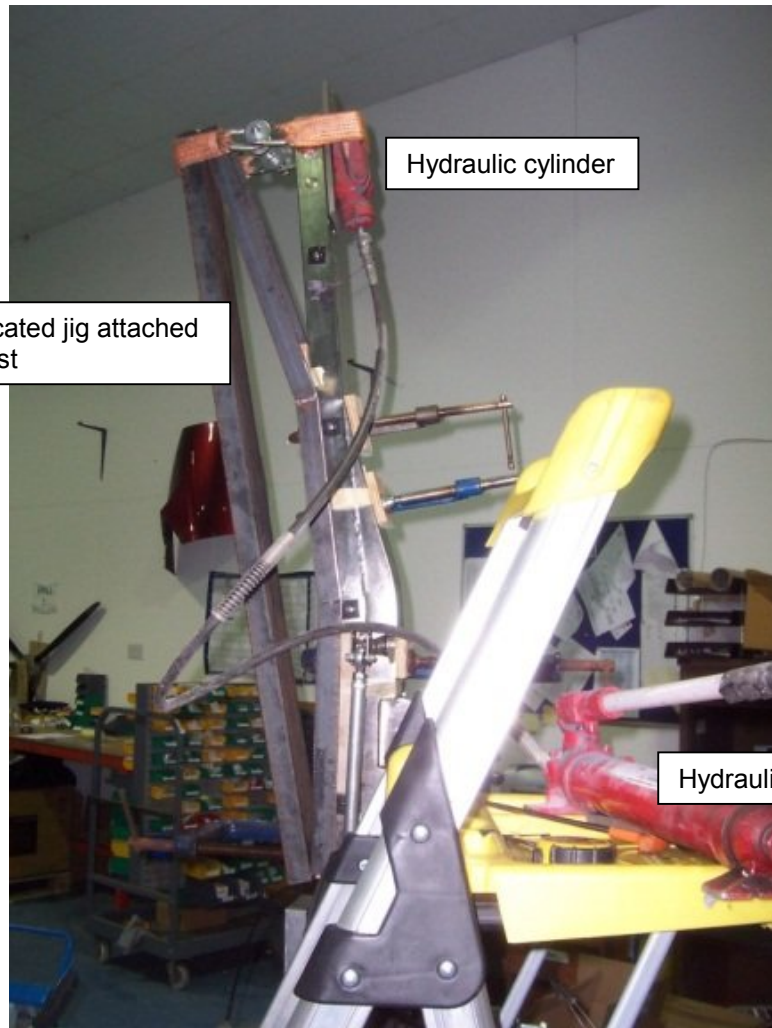
The mast section of the airframe bent laterally (progressively and without evidence of buckling).

The mast section is doubled in the area of the bend (which is between the welds as shown)

After rebend the integrity of the box section and adjacent welds is to be inspected as noted below. This is confirmed by completion of the worksheet at the end of this document SRA-017.

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Fabricated jig attached to mast

Hydraulic cylinder

Hydraulic hand-pump

Principal of re-bending force application as completed on an MTseries gyroplane

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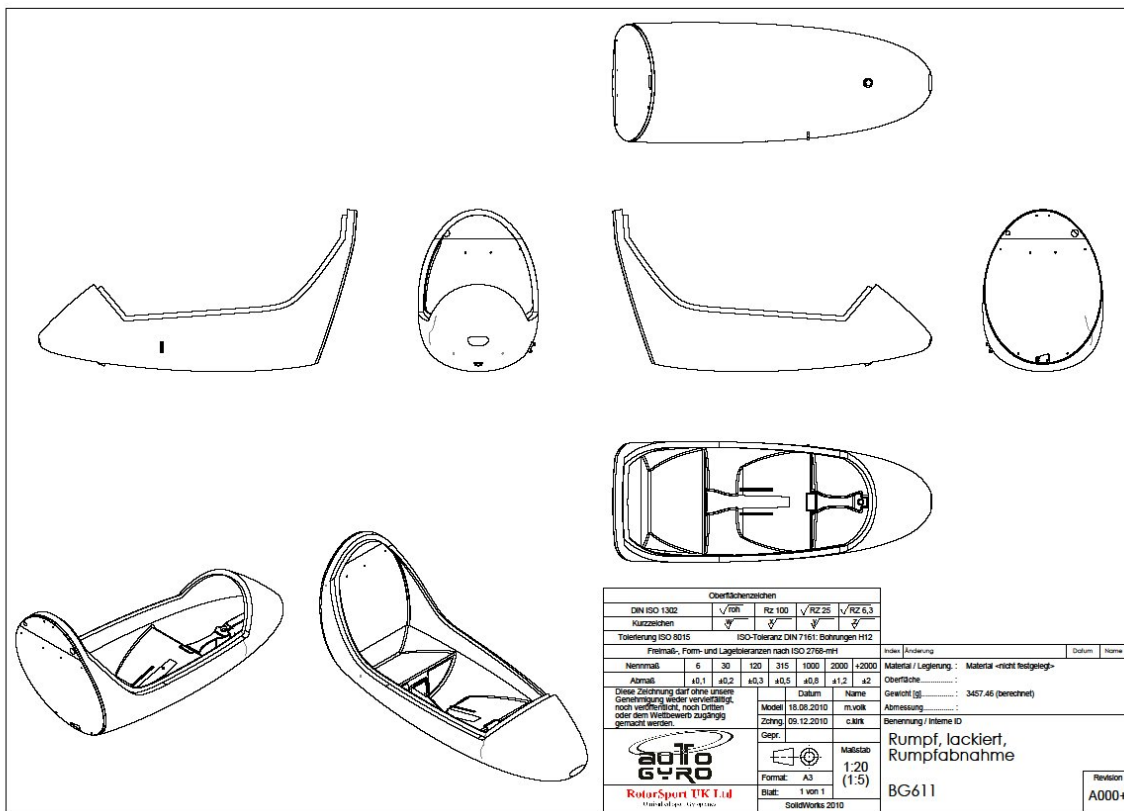
(iii) Composite repairs

These are modelled on the previous successful repair of G-CGOT under MC-197/SRA-010

The body (complete) is shown by BG611 and is constructed from the two major composite sub-assemblies BG958 (shell) BG974 (floor). The bill-of-materials for BG611 breaks down the complete construction to the lowest-level parts (e.g. cut pieces of fibre reinforcement, resin system and metal inserts)

Process sheets for the sub-assemblies show how they are constructed from these listed parts. By examination of these process sheets and review of the bill-of-materials the various layers requiring repair and the constituent materials can be identified.

The various sub-assemblies drawings are shown below:



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Das Bauteil wird in einer Negativ Form erstellt
Diese beinhaltet alle Referenzpunkte in Form von gehärteten Bohrbuchsen

Oberflächenzeichen		ISO-Toleranz DIN 7181: Bohrungen H12		Inhalt / Änderung		Datum / Name	
DIN ISO 1302	√/Rz	Rz 100	√/Rz 25	√/Rz 6,3			
Kurzzeichen	√	√	√	√			
Tolerierung ISO 8015							
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mS							
Nennmaß	6	30	120	315	1000	2000	+2000
Abmaß	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.				Datum	Name		
				23.09.2009	h_besch		
				Zytrag	o_birker		
				Gepr.			
				Format: A3	Maßstab: 1:15 (1:5)		
Blatt: 1 von 1				Benennung / Interne ID			Revision
				Body Laminiert			A000+
				BG958			

Die Bohrungen für die Bauteile der Baugruppe sind durch die negativ Form vorgegeben
Die Position der vorderen Spantfen ergibt sich aus dem Eckradius der Handfächer

Oberflächenzeichen		ISO-Toleranz DIN 7181: Bohrungen H12		Inhalt / Änderung		Datum / Name	
DIN ISO 1302	√/Rz	Rz 100	√/Rz 25	√/Rz 6,3			
Kurzzeichen	√	√	√	√			
Tolerierung ISO 8015							
Freimaß-, Form- und Lagetoleranzen nach ISO 2768-mS							
Nennmaß	6	30	120	315	1000	2000	+2000
Abmaß	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt, noch veröffentlicht, noch Dritten oder dem Wettbewerb zugänglich gemacht werden.				Datum	Name		
				23.04.2010	c_birk		
				Zytrag	o_birker		
				Gepr.			
				Format: A3	Maßstab: 1:10 (1:5)		
Blatt: 1 von 1				Benennung / Interne ID			Revision
				Bodengruppe			A000+
				BG974			

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BG5839_KU_R008 Body laminiert PPS Zuschnitt

1 Zuschnitt

1.1

Nr.	Anzahl	Material (Glas, Carbon)	Gramm. [g/m ²]	Webart (Köper, Leinen, UD,KD)	IG- Nummer	Ausricht. 0/90: — +45/-45: #	Zuschnitt L / B [mm], Skizze, Schablone
1	4	Glas		Roving	EC14-2400-P185 (50)		4 Stränge x 2000
2	2	Glas		Roving	EC14-2400-P185 (50)		4 Stränge x 3000
3	2	Glas		Roving	EC14-2400-P185 (50)		16 Stränge x 3000
4	4	Glas	280	Köper	92125	—	2600 / 1000
5	2	Glas	390	Köper	92140	—	2600 / 1000
6	5	Carbon	200	Leinen	Style 450	#	Skizze a)
7	2	Glas	390	Köper	92140	—	1500 / 1000
8	12	Glas	500	UD	236		2500 / 800
9	2	Glas	390	Köper	92140	#	Skizze a)
10	4	Glas	390	Köper	92140	—	200 / 200
11	2	Glas	390	Köper	92140	#	300 / 300
12	4	Glas	390	Köper	92140	—	100 / 100
13	4	Glas	390	Köper	92140	—	150 / 150
14	4	Glas	390	Köper	92140	—	200 / 200
15	4	Glas	390	Köper	92140	—	250 / 250
16	2	Glas	390	Köper	92140	—	150 / 150
16.a	2	Glas	390	Köper	92140	—	200 / 150
16.b	2	Glas	390	Köper	92140	—	250 / 150
16.c	2	Glas	390	Köper	92140	—	300 / 150
16.d	2	Glas	390	Köper	92140	—	350 / 150
17	4	Glas	390	Köper	92140	—	80 / 80
18	4	Glas	390	Köper	92140	—	100 / 100
19	4	Glas	390	Köper	92140	—	160 / 160
20	4	Glas	390	Köper	92140	—	200 / 200
21	4	Glas	390	Köper	92140	—	240 / 240
22	4	Glas	390	Köper	92140	—	300 / 300
23	5	Glas	390	Köper	92140	—	200 / 200
24	5	Glas	390	Köper	92140	—	300 / 300
25	1	Glas	390	Köper	92140	—	100 / 150
26	1	Glas	390	Köper	92140	—	120 / 170
27	1	Glas	390	Köper	92140	—	140 / 190
28	1	Glas	390	Köper	92140	—	160 / 210
29	1	Glas	390	Köper	92140	—	180 / 230
30	1	Glas	390	Köper	92140	—	200 / 250
31	3	Glas	425	KD	215		4200 / 75
32	2	Glas	390	Köper	92140	—	100 / 100
33	3	Glas	390	Köper	92140	—	Skizze b)

Produktionshinweise zu BG5839_KU_R008 Body laminiert PPS Zuschnitt

Letztes Update am 27.08.2013 um 08:28:57 von Dirk Jahnke.
BG5839_KU_R008 Body laminiert PPS Zuschnitt

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Extract from Bill-of-materials for BG5839 (forms BG958 shown above)

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Method statement:

1. Only Larit L-135 Resin and L-137 hardener may be used for laminating the repair, thoroughly mixed in the ratio 100:35.
2. Locally abrade the outer surface of the enclosure thru to the inner layer so that the body of the enclosure may be built-up with the correct sequence of materials defined in Auto-Gyro process sheet C.KU01.....04 Body.
3. Reinstall the wall of the enclosure using the materials defined. The cut pieces should progressively reduce in size. Use vacuum bag to ensure that the resin fully penetrates the repaired area.



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On completion of the profile of the body, cut through to expose the mounting ring of the left-hand landing-light. Clean the bore of the mounting ring to remove any excess resin.

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4. Remove the aluminium steering bush to enable the same repair procedure to be applied to the area around the nose-wheel mounting. After reconstruction of the body profile dress the mounting hole and refit the bush, retaining in the composite with beads of resin



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5. Use thin wooden or plastic wedges to spring-away the delaminated inner skin. Fill the void with resin, remove the wedges and jury-rig spreaders to hold the inner skin in the correct location



6. Cure the repair for 6 hours at room temperature using infra-red lamps to assist.



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7. Rub-down and apply polyester gel-coat followed by surfacer-primer to achieve a satisfactory cosmetic finish.
8. Post-cure in a temperature-controlled chamber mounted around the repaired area for 12 hours at 60°C
9. Apply further surfacer-primer and hand-finish to remove blemishes.
10. Rub-down, degrease and re-paint the body using the minimum amount of paint to achieve a satisfactory finish. Air-dry the paint system at room temperature

Reference to other documentation

Present Modification Classification the subject of this SRA-017 is MC-246.
Similar previous Modification Classification MC-197/SRA-010.
Auto-Gyro process sheets for Body (complete) C.KU01.01.01
(these are too complex to embed in this document but were made available during preparation for the repair)

Test and inspection records

None other than completion of the worksheet at the end of this document

Special tools & Health and Safety requirements, and/or components required for repair:

- (i) For mast straightening construct a special disposable fabrication from rolled-steel-angle and channel sections (see photo below for guidance)
- (ii) During sanding and painting wear appropriate PPE

Quality Inspection requirements after repair – record in Worksheet attached:

- (i) Mast
Using a magnifying glass at least 10x and good illumination inspect the box sections and adjacent welds in the area of re-bend to ensure that no cracks are present
- (ii) Composites
Visual inspection after painting to meet paint standards
- (iii) Final Assembly
Verification of new a/c weight/placard amendment if needed

Flight test requirements after repair:

Following the repair (and associated engine inspection/propeller repair) a confirmatory flight test is to be flown to prove there is no change in flight characteristics. This flight test will follow the standard format of the Production Conformance flight test used for Calidus aircraft and is reported in FTR-313

Documentation completion:

CAA BCAR A3-7 Authorised Person to certify that the work is completed by writing 'SRA-017 Composite and mast repair' in the aircraft logbook white pages. The entry must be signed by the CAA Authorised Person together with their CAA Authorisation number.
The same person to complete the worksheet/PMR form at the end of this document

Service repair authorised by: (name, signature, and date of signature)

Quality Control Manager	Engineering Manager	Chief Test Pilot (where an effect on flight performance or safety)	CVE	Head of Airworthiness
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Document effectivity date:

23.09.13

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Aircraft serial no. Registration G-	Service Repair Implementation Worksheet	Date raised: Raised by:	
Purpose – record service repair implementation actions taken, then to inspect aircraft and return to service.		Document reference: SRA-017	
Maintenance manual referred to and issue level/date:			
Note; attach any secondary sheets to this document			
Task	Notes	Eng'r check/date	Inspector check/date
Record aircraft service hours (from log-book)	Aircraft service hours:		
Mast free of cracks after re-bend			
Paint finish on composite parts acceptable			
Placards correct wrt aircraft weight			
Confirm no tools or equipment left in aircraft			
Customer acceptance: Name: Signature/date:		Aircraft Hobbs meter reading: Confirm logbooks annotated:	
Permit Maintenance Release: The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight.			
Engineer/Inspector signature Name: CAA Authorisation code :		Date of work Location where work completed	

PLEASE FAX THIS BACK TO 01588650769 (or send by email to info@rotorsport.org)