

Addendum 1 to Cavalon Pro Gyroplane Maintenance Manual

For the Gimbal mounted camera modification MC-338

Document number RSUK0371

**This document must be read in conjunction with the current issue of
Cavalon Pro Maintenance Manual RSUK0345**

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CAA Approval No: DAI/9917/06

Applicability

Aircraft Registration:	G-
Aircraft serial no.	RSUK/CAVP/
Engine type:	Rotax 914F
Engine serial No:	
Rotor blade type & diameter:	Autogyro 8.4m RotorSystemII TOPP (blue cap)
Propeller type:	Woodcomp sro KW-31 in-flight pitch adjustable

CONTENTS AND CHECK LIST OF PAGES

<u>Content</u>	<u>Page No.</u>
Cover page	1
Applicability	2
Contents and checklist of pages	3
Section 1	
Amendments to the schedule	4
List of effective pages	
Section 2	
Introduction	6
Section 3	
Periodic and functional checks	9
Section 4	
Maintenance requirements	11
Section 5	
Gimbal fitment	11
Section 6	
Bracket assy fitment and removal.	11

SECTION 1

AMENDMENTS TO THE SCHEDULE

1. Where & when necessary RotorSport UK Ltd (hereafter referred to as RSUK) will issue updates to this maintenance standard, and will notify known owners to review the changes via the RSUK website with changes appropriately identified by a strike in the margin.
2. Aircraft operators are responsible for ensuring that amendments to their publication are carried out immediately and in accordance with instructions contained in amendment transmittal letters (where issued).

ISSUE NUMBER	DATE	INSERTED BY	ISSUE NUMBER	DATE	INSERTED BY
Initial			4		
1	27.04.16		5		
2			6		
3			7		

Issue	Change summary
1	First issue
2	Intentionally blank
3	Intentionally blank
4	Intentionally blank

Statement of initial certification: This manual complies with British Civil Airworthiness Requirements		
RotorSport UK Ltd approval signatures for the above manual issue.		
Signature:	Signature:	Signature:
Position: Engineering Manager	Position: Head of Engineering	Position: Head of Airworthiness

List of Effective Pages

Page	Issue	Date		Page	Issue	Date
Page 1	1	27.04.16				
Page 2	1	27.04.16				
Page 3	1	27.04.16				
Page 4	1	27.04.16				
Page 5	1	27.04.16				
Page 6	1	27.04.16				
Page 7	1	27.04.16				
Page 8	1	27.04.16				
Page 9	1	27.04.16				
Page 10	1	27.04.16				
Page 11	1	27.04.16				
Page 12	1	27.04.16				

2 Introduction

2.1. A nose-mounted moving camera system specified under modification MC-338 is available for fitment to Cavalon Pro gyroplanes, and has been approved by UK CAA under AAN29428 Addendum 2. A proprietary gimbal system is mounted on a vertical slide fitted to the front of the gyroplane. This gimbal system has three-degrees-of-freedom and enables the camera mounted inside it to be moved:

- 360 degrees in horizontal rotation (continuous) around a vertical axis
- 210 degrees in vertical rotation around a horizontal axis
- +/- 45 degrees in roll

The camera itself has motorised zoom and focus capability.

The whole gimbal arrangement, internal camera and control console is supplied by Dynamic Perspective GmbH as the DynaX5 gyro-stabilised camera platform. Various Broadcast-quality and Cine-quality camera options are supported by the Dynamic Perspective platform.



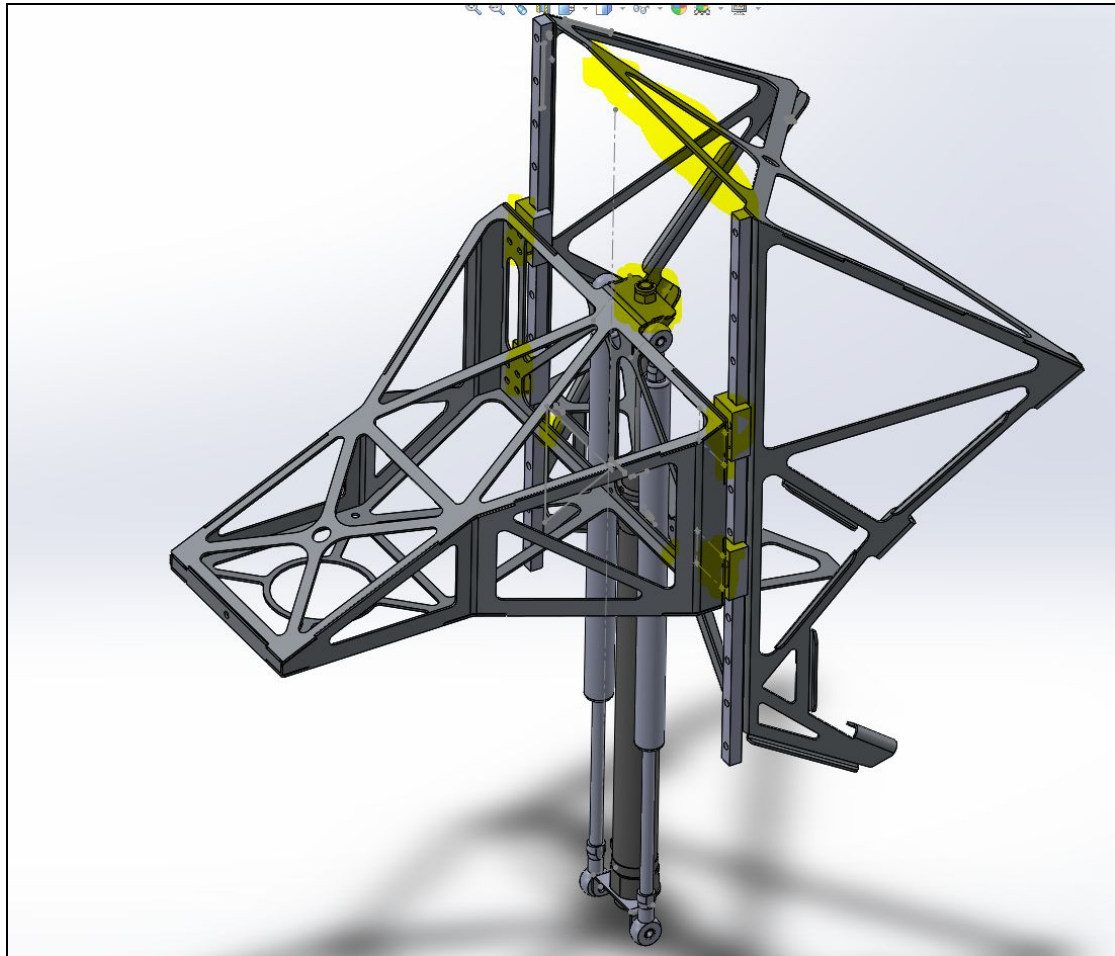
Externally-mounted gimbal



Console carried inside cockpit

2.2. In order that the field of view of the camera is not interrupted by the aircraft nose-wheel the gimbal system is mounted on the vertical sliding mount attached to the front of the aircraft. This slide is pneumatically powered and its movement is controlled by two conventional gas-struts. These gas struts also provide emergency lifting capability in the event of pneumatic system failure.

A schematic of the sliding mount is shown below:



2.3. The mount is normally moved up/down by the pilot using a rotary valve mounted on the instrument panel to the left of the aircraft's centre console. In the event of pneumatic system failure the air pressure can be released by means of a toggle-operated valve and the mount will then rise under power from the gas-struts alone. To show the pilot that the gimbal is in the lowered (filming) position a green LED is provided. There is no need for an indicator for the retracted (landing) position as the gimbal mounting moves into the pilot's field-of-view.

2.4. In order to provide compressed-air for the pneumatic system an electrically-driven compressor, air-drier and 8bar pressure switch are fitted into a single pneumatic control box. This box also contains adjustable flow-control valves used to control the air cylinder speed (these are set during system commissioning and should not be disturbed). Electrical supply to this control box is provided from the "Aux" circuit-breaker F19 (10A) which is controlled by the aircraft master-switch and the load-shedding relay arrangement. Interface is by means of a polarised connector mounted in the wall of the control box.

2.5. In order to provide 12VDC electrical supply for the gimbal/camera system a specific cable is run from the battery (at the rear of the aircraft) to the left of the instrument panel where a toggle switch and relay are provided. This cable has a 40A line fuse (located near to the battery). No warning lights are provided.

Note: it is the camera operator's responsibility to place the gimbal in the nominated "Park" position before the vertical slide is operated for take-off or landing - no interlocking is provided.

2.6. The gimbal and turret are held in the nominated "Park" position by the action of internal servo-motors, so the system must be powered-up at all times the aircraft is moving on the ground or in the air, otherwise the components may droop or rotate uncontrollably.

3. Periodic and Functional checks.

- 3.1. The following checks are carried-out prior to flight and should be repeated each time the aircraft is inspected by an engineer every 100 flight-hours or Annually (whichever is sooner)
- 3.2. Visually inspect the vertical slide system structure for cracks, broken welds or other damage. Check the body interface for cracks and security of mounting (6-places)
- 3.3. Visually inspect the slide-system pipework for cuts, bursts and security of attachment
- 3.4. Visually inspect the gimbal/camera system cables for damage, breaks and security of attachment
- 3.5. Clean the visible surfaces of the slide-way rails with a soft cloth or tissue moistened with thin oil or WD40. Inspect for damage to the rails, there must be no dents (e.g. from flying object damage) or accumulated debris.
- 3.6. Clean the visible surface of the cylinder rod and gas-strut rods with a dry soft cloth. There must be no damage or accumulated debris.
- 3.7. Check for free movement of the rod-end bearings of the gas-struts (4-places)
- 3.8. Using two people lift the nose-wheel of the gyroplane onto a suitable block at least 300mm high. Apply the parking brakes.
- 3.9. Significant electrical power is now required so either a high-current ground-power connection should be made or the checks must be conducted with the engine running. In the former case temporarily release the Gen1 and Gen2 circuit breakers. In the latter case the pilot must occupy the P1 seat and appropriate safety precautions **MUST** be established and observed.

WARNING

When the system is being moved on the ground ensure that both the operator and any third-parties cannot be trapped by the moving parts.

- 3.10. Using the toggle switch turn on the gimbal/camera supply. Follow the Dynamic Perspective operating instructions to establish/confirm the default "Park" position
- 3.11. Turn on the aircraft master switch and listen for the compressor running to establish system pressure. Ensure that the toggle-operated valve is set to "Closed". Select the rotary valve to "Down" - the slide system should move slowly (approx. 18secs) to the down position. In the "Down" position the green Led indicator should be illuminated
Select the rotary valve to "Up" – the slide system should move slowly (approx. 10secs) to the up (retracted) position.

3.12 Return the system to the “Down” position then test the emergency lifting mechanism by changing the toggle valve to the “Open” position – the slide system should lift to the “Up” position. If satisfactory revert to the standard operating arrangement by setting the rotary valve to “Up” position then the toggle-operated valve to “Closed” – there should be no movement but the compressor may be heard running.

3.13 Position the slide system to the “Down” position and carry-out the system checks required by the Dynamic Perspective operating instructions (see DynaX5 User Manual version 3.1 or later).

3.14 Follow the Dynamic Perspective operating instructions to establish the default “Park” position then lift the slide system by selecting the rotary valve to “Up”

3.15 Stop the engine (if running) and turn off the master switch. Disconnect ground power (if fitted). Reset all circuit-breakers. Lift the gyroplane off the raising block and remove this from the gyroplanes path.

4. Maintenance requirements

4.1. The Dyna X5 gimbal and camera system should be maintained to the requirements of Dynamic Perspective (see DynaX5 User Manual version 3.1 or later).

4.2. The components of the slide system are maintenance-free (subject to the note on cleaning in 2 above). The primary fasteners are:

- Attachment to body M6 screws/nyloc nuts
- Attachment of rails M3 screws/nyloc nuts
- Rail end stops M3 screws/Loctite 243
- Rail carriages M4 screws/Loctite 243
- Cylinder body nut with wire-locking (both ends)
- Cylinder rod nut/Loctite 243
- Rod end bearings/nyloc nuts

4.3. The air drier (water absorber) within the pneumatic control box should be removed and dried-out (domestic oven at 50degC for ½-hour) or changed every 100 hours. It must be replaced with new at 500 hours of operation.

WARNING

When working on the system ensure that all compressed air is depleted and be extremely cautious of the stored energy of the gas-struts.

5. Gimbal and camera fitment and removal.

5.1 The camera is fitted and removed in the Gimbal by following the instructions in the Dynamic Perspective Gimbal manual.

5.2 The gimbal is retained to the aircraft mounting bracket via 4 x M6 bolts and nuts. The bolts are integral with the gimbal and supplied by Dynamic Perspective. The bolts are attached via 1 x plain M6 nut and 1 x nylock M6 nut as an independent locking method. Care should be taken that the bracket is properly 'up' before fitting or removing the camera with full system pressure.

5.3 The camera cables are routed on the left of the aircraft in through the access hole on the underside, and attached to the camera junction box attached via Velcro on the right of the left seat footwell. The box power supply is fed via the 40A relay supply in the left footwell.

6. Bracket assembly removal and refitting

6.1 the bracket assembly may be removed to allow normal night operation with the heated pitot re-installed or other flight activity. The pneumatic operating system and controls remain in place.

The 'aux' CB for the pn box is isolated.

The gimbal is removed with all associated cabling.

The PN system is vented by operating the Vent switch.

The PN and sensor cables for the bracket assembly are detached behind the instrument panel, and pulled carefully through the Pitot aperture.

The six attachment fastenings between the assembly and the aircraft released and the assembly removed.

The fastening holes are filled with the fastenings.

The heated pitot tube is re-attached to its fasteners and protrudes through the aperture.

The heated pitot pressure line is attached in place of the unheated line for the bracket assembly – test as shown in the AMM that this is properly connected.

On first flight the pilot has to ensure that the ASI accuracy is acceptable, or adjusted via the bleed valve as required to achieve +/-5%.

Refitment is a reverse of the above.