

Policy and guidance on mounting cameras on aircraft

CAP 1369



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Prelims

Introduction

In light of the increased popularity of airborne photography and video recording, made possible by advances in digital camera design, the CAA previously provided guidance to assist owners and operators in how to safely install such equipment on CAA regulated aircraft as minor changes.

Based on the feedback we've received from the General Aviation (GA) sector, one of the key challenges faced is that each camera installation needs to be judged on a case by case examination to consider the airworthiness risks that could be posed (including installed aircraft and 3rd party risks), hence it can be difficult to cover all eventualities in guidance without seeming to be overly prescriptive or overly regulating what could, for one particular installation and location on a specific aircraft, be a fairly simple and low-risk design.

In view of the above and in order to be more proportionate our original guidance has been revised to provide this policy for an alternative route for the approval of light, simple and small camera installations, using a methodology whereby Licensed Aircraft Engineers, (LAEs) with a part 66 licence or BCAR licence will be able to examine such installations and to certify whether an acceptable airworthiness standard has been achieved. Note that the traditional minor mod approval route via the CAA or approved organisations remains available.

This approach is broadly consistent with the generic methodology being adopted by EASA under the CS-STAN code. The CS-STAN Issue 1 has been recently published at Phase 1 - [CS-STAN](#), which also uses a methodology whereby Licensed Aircraft Engineers are able to review and certify the airworthiness of certain specific minor modifications and minor repairs as applicable to certain classes of EASA aircraft, to some areas of an aircraft or to certain aircraft operations as noted in the specific CS-STAN paragraphs.

This policy does not apply to hand-held carry-on cameras, nor devices worn by the pilot e.g. helmet-mounted cameras, which do not require any particular approval

when they are used in these hand-held or worn operational modes. However there should be suitable judgement exercised to assure that such equipment does not pose any additional risks including any adverse effect on the wearer's ability to get out of the aircraft in an emergency, obstruct the pilot's view or cause unintentional operation of controls etc, that could affect the pilot's ability to fly the aircraft. Suitable care when handling the camera and use of retention straps is advised to mitigate the risk to the aircraft, its occupants and to third parties that could arise from dropping the camera. See also section below for further notes on good airmanship, safety and legal warnings.

Applicability

This policy is applicable to non-EASA GA aircraft that are subject to UK CAA regulatory oversight, (CAP 747- Mandatory requirements for airworthiness contains the list of specific EASA and non-EASA aircraft types. It also provides a statement of the general categories of aircraft that are excluded from European regulations and so remain subject to national rules under Annex II to the basic Regulation (EC) No. 216/2008).

We have also reviewed the camera installation guidance and policy material that has been generated by the BMAA, LAA, and BGA and have incorporated certain elements of that material in the following sections. In the case of types that are under the oversight of BMAA and LAA, the material generated by those organisations should be used.

Note – it is intended that CAA will provide a copy of this CAA policy document to EASA for potential inclusion in a future update to CS-STAN so that the camera mount policy can be extended to EASA aircraft; if EASA do update CS-STAN we will review whether further updates should be made to this guidance. In the interim the current EASA rules will continue to apply for EASA Aircraft and Modification approval will still need to be sought via EASA HQ for camera installations on those applicable types where there is no existing CS-STAN requirement to address.

Scope

This guidance addresses small camera installations mounted internally or externally on aircraft structures that are self-contained, (with internal batteries and no external wiring), such as GoPro and similar size cameras that are of small form factor and relatively light, (<250 g including mountings).

Such installations would be expected to have low or negligible effect at the aircraft level with regard to mass, centre of gravity, structural strength and drag and would thus be expected to have no appreciable effect on aircraft systems, handling or performance.

Risks to the aircraft and its occupants as well as third party risks posed by the installation including potential camera and mount detachment need to be managed and mitigated by careful installation that will be assessed by the LAE for acceptability and documented accordingly.

Larger and more complex camera installations, (including multi camera systems, connections to aircraft power / systems), which are likely to have more significant effects on structures, systems, handling and performance etc, are considered outside the scope of this material and thus will constitute modifications requiring approval under the CAA modification process. Information and guidance associated with the approval of modifications and repairs for CAA regulated aircraft can be found [here](#).

A further increase in scope of this material may be considered at a later date subject to satisfactory service experience gathered from initial applications.

Guidance on installation assessment and approval by a Licensed Aircraft Engineer (LAE)

The camera installation will need to be assessed by a Licensed Aircraft Engineer before the first flight in situ on an aircraft. Guidance on acceptable installation practices and the assessment process to be followed are provided in the attached Appendix A installation checklist – this has been developed from previous CAA advice and relevant material that has been supplied by LAA, BMAA and BGA, (see Other Guidance (reference only) section below for references).

Subject to satisfactory compliance with the points contained in Appendix A, the LAE will need to sign the installation checklist and complete the aircraft logbook entry.

Other guidance (reference only)

- [The British Microlight Aircraft Association \(BMAA\) Technical Information Leaflet No.17](#) provides guidance for installing cameras on microlight aircraft.
- The LAA are due to publish a draft Technical Leaflet TL3.24 “CAMERA INSTALLATIONS”.
- The BGA has written a Safety Briefing advice sheet “[Mounting Cameras for Use in the Air](#)”

Good airmanship, safety and legal warnings

It is incumbent upon the pilot to ensure that he/she is operating within the relevant legislation including but not limited to: the low flying rules, the prohibition on taking photographs of restricted/prohibited and danger areas.

Aerial work is not allowed with Permit to Fly (PtF) aircraft except under the circumstances listed in the ANO or on the PtF certificate.

During the flight, the pilot should not use or operate a handheld camera or other handheld remote sensing equipment.

Flying the aircraft safely is always paramount, taking photos or videos can be distracting especially if the equipment appears to demand immediate attention - fly the aeroplane first, lookout second, navigate third, take photographs fourth.

Note that the UK ANO CAP393 article 38(5) requires all equipment to be installed or stowed such that it does not present a danger or impair the airworthiness of the aircraft.

Appendix A

LAE installation checklist

General installation requirements and guidelines

The installation must be inspected by an LAE who will review the camera installation against the points below and complete and sign the sections below to confirm that the installation is satisfactory.

Aircraft registration	Type	Serial no.
G-		

General installation requirements and guidelines checklist		Tick or n/a
1.	Cameras are physically attached to the airframe using secure mountings. Where clamps are used, care should be taken to ensure that they do not damage the aircraft structure – the use of a suitable intermediate / interfay material should be considered.	
2.	Secondary locking of fasteners / connections must be applied – secure with cable ties, or locking wire, nyloc nuts (which should not be re-used). Battery and other camera access compartments should be checked and taped over for additional security.	
3.	Mounting is not on slender components.	
4.	If existing airframe structural fastener locations are picked up then additional installed brackets should be of the same material as the underlying structure and bolts will be need to be lengthened as necessary to remain in safety / maintain suitable thread engagement and protrusion, however it should be ascertained that no external or internal parts or systems	

General installation requirements and guidelines checklist		Tick or n/a
	including flying controls could be fouled or obstructed by employing longer fasteners. Note that no bracket should be introduced that acts as a packer between major load paths e.g. where the bracket would act as a washer under the bolt head or nut – the size of the bolt should be taken into consideration and all disturbed fasteners must be inspected prior to flight by the LAE.	
5.	Further to the above, the structural integrity of the aircraft must not be compromised by the installation due to cutting or by drilling of new or enlarged holes.	
6.	The use of suction mountings is not generally acceptable for externally mounted cameras.	
7.	If suction mounts are used inside the cockpit or cabin, a suitable secondary retaining lanyard or strap should be attached to the mounting to prevent damage or a control jam should the primary suction mount become detached.	
8.	Cameras mounted inside the aircraft in occupied areas should be installed so as to meet the requisite crash load requirements so that they will not detach and cause injury in the event of an emergency landing - for suction mountings the primary suction mounting and secondary lanyard /strap should be assessed so that each is independently capable of carrying the loading, (see item 13 below). Pull testing should be used to confirm the integrity of the secondary retention to at least 10 times the weight of the unit. Periodic re-checking of the primary mount integrity is advised.	

General installation requirements and guidelines checklist		Tick or n/a
9.	<p>Proprietary self-adhesive mounts can be used in accordance with the manufacturer's instructions provided that they are capable of passing the pull test. Installation of a secondary independent lanyard/strap retention feature may also be considered prudent when using these types of mounts. There is also concern that self-adhesive mounts may be subject to environmental deterioration especially for installations used over a long period of time. Both the self-adhesive and the airframe surface coating / interfay medium that it is adhered to are subject to ageing and environmental degradation – careful periodic inspections and a pull test of the mount strength integrity will be performed if there are signs of deterioration – inspections are detailed in the comments section below.</p>	
10.	<p>Mounting must be on fixed surfaces of the airframe, i.e. not on control surfaces or on control system components subject to motion. There must be no interference with flying controls. Cameras should not be fitted in front of or close to flying controls, pitot-static probes or angle of attack sensors, or in locations where flow into or out of system ducts / cowlings etc., may be interfered with or otherwise impeded.</p>	
11.	<p>If the camera is fitted in or near the cockpit, it must not interfere with any cockpit controls, nor obstruct the pilot's view of instruments, the pilot's external view or cause a distraction, (the flash window / gun should be taped over).</p>	
12.	<p>The camera should be mounted in a position such that if it were to detach from the aircraft or become loose, it will not cause harm to occupants nor impact any critical parts of the</p>	

General installation requirements and guidelines checklist		Tick or n/a
	aircraft (e.g. propellers, engine, flying control surfaces and systems, airspeed sensors).	
13.	<p>Push/Pull test requirement – the camera and its attachment mountings should be weighed prior to installation and checked to ensure that the total weight does not exceed 250 g. In order to check the security under flight, ground and emergency landing cases, a spring balance or other suitable method should be used to apply separate loads to the mounted camera of at least:</p> <ul style="list-style-type: none"> ▪ 9 times the weight forwards , ▪ 4.5 times the weight up, ▪ 6 times the weight down, ▪ 3 times the weight port, ▪ 3 times the weight starboard. <p>Loading should be applied for at least 3s with no failure, damage or permanent distress. Higher factors should be considered as appropriate to aerobatic use to include a 9 times weight downwards case. In addition external cameras should be subjected to a proof load test in the drag direction prior to flight - a minimum drag load of 2 kg should be used. The drag load should be checked to be appropriate for the size of the camera and the maximum design speed of the aircraft; for example, (using a drag coefficient on unity at sea level), a 4 cm by 10 cm = 40 cm² cross section normal to a 150 knot airstream would generate ~ 1.5 kg drag load. This value will scale up directly with area so a camera/mount that is 2 times the area will see 2 times the drag load, whilst an increase in the airstream will increase drag by the square of the airspeed, thus 2 times the airspeed gives 4 times the drag. Note that installations mounted in areas affected by propeller slipstream</p>	

General installation requirements and guidelines checklist		Tick or n/a
	will need to be designed to withstand increased drag loads.	
14.	Continued Airworthiness monitoring of the mounting and camera installation is to be carried out at regular intervals – this is detailed in the comments section below. Careful periodic inspection should check the integrity and security of the camera mounting hardware. Parts that show signs of deterioration must be rectified or replaced.	
15.	In order to reduce the risk of electromagnetic interference (EMI) with aircraft systems, cameras that are equipped with wireless interface and activation systems (including WiFi / Bluetooth and similar wireless technologies with potential for transmitting EMI) should be placed in a 'flight safe mode' with the wireless functionality disabled; a limitation note to this effect should be recorded by the LAE below for the attention of the pilot/owner.	

Additional comments and limitations related to the checklist above	
Checklist number	Comments

Additional comments and limitations related to the checklist above	

LAE sign-off	
All sections of the form completed	
Attached installation sketch and a list of parts	
Location of installation	
Name (PRINT)	
Aircraft Engineer's Licence number	
Date	
Signature	