Guidance for applicants on preparing applications for the approval of minor modifications to non-EASA aircraft

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Purpose

This document and its appendices provide guidance, to applicants who do not hold CAA BCAR A-8 or EASA Part 21 Design Organisation approvals, for the preparation of the data required to support applications for the approval of minor modifications to UK registered non-EASA aircraft. EASA is responsible for providing equivalent guidance for the approval of minor changes to EASA aircraft.

The guidance within this document uses the term ‘modification’ to refer to an alteration of UK registered non-EASA aircraft. A minor modification is one that requires CAA approval but has no appreciable effect on airworthiness, as further explained in paragraph 1.2. The guidance also refers to the term ‘design change’, which is the equivalent term used by EASA within Part 21 to refer to alterations to EASA aircraft.

This guidance, which was previously available from the CAA website, is provided to enable applicants to prepare data that can be approved without unnecessary delay that may result from the submission of incomplete or ambiguous data.

This format was issued in 2017 to replace the CAA website as the location of this guidance, to amend the scope to apply to UK-registered Non-EASA aircraft only, reflect the issue of CS-STAN, update references to TGLs and AMC materials and to provide clarification regarding the recording of compliance with CAA-only Generic Requirements.

EASA aircraft

EASA is responsible for providing guidance for the approval of minor changes to EASA aircraft. It should be noted that applications for the approval of minor changes are made directly to EASA using the EASA Form 32, which is available from the EASA website.

EASA may allocate the technical assessment of minor changes for UK originated applications to the CAA. Minor change applications are assessed by the CAA’s

certification specialists within the GA Unit or Airworthiness at Aviation House, Gatwick. The CAA is expected to determine that each minor change applicant has demonstrated compliance with the applicable airworthiness requirements as required by Part 21.A.93 before recommending approval to EASA. When satisfied that compliance has been demonstrated, CAA will compile a Technical Visa and submit it to EASA. The change approval certificate is issued by EASA.

Non-EASA aircraft

Applications for the approval of minor modifications to Non-EASA aircraft should be made on CAA Form SRG 1726 and, together with the appropriate fee, directed to:

Civil Aviation Authority
Safety Airspace Regulation Group
Shared Services Centre
Aviation House
Gatwick Airport South
West Sussex RH6 0YR

Applications may also be submitted by email to apply@caa.co.uk.

The SRG 1726 application form is available on the CAA website.

Details of charges can be found in the CAA Scheme of Charges - Airworthiness, Noise Certification and Aircraft and Aircraft Engine Emissions ORS 5.

Approval of a minor modification will be indicated by the CAA's issuance of a signed Minor Modification Approval Certificate.

Chapter 1

Introduction

1.1 The guidance presented within this publiction is intended to assist the application for the approval of minor modifications to UK registered Non-EASA aircraft.

1.2 A modification to an aircraft may be classified as ‘minor’ when it does not have an ‘appreciable effect’ on:

- Mass,
- Balance,
- Structural strength,
- Reliability,
- Operational characteristics, or
- Environment (noise, emissions, fuel venting).

Or where the modification does not introduce:

- New Certification basis/interpretations/aspects of compliance or requires an extensive re-evaluation,
- Changes to limitations,
- MPD/AD terminating action, or
- Functions with Catastrophic or Hazardous failure conditions.

The guidance material (GM) within BCAR A8-21 Appendix 2 provides further considerations that affect the modification classification for UK registered Non-EASA aircraft.

EASA has published specific guidance regarding the classification of common design changes for general aviation aircraft on the ‘General Aviation FAQs’ page of their website. The content of this is also accepted as guidance to be referred to when agreeing modification classifications with CAA for UK registered Non-EASA aircraft.

1.3 The data submitted in support of an application for the approval of a minor modification needs to convey the following information:

- A definition of the modification – what it is doing and on what aircraft,
- Details of how the modification is embodied (accomplishment instructions),
- Details of how the modified aircraft is maintained (Instructions for Continued Airworthiness – or ICA),
- Details of how the modified aircraft is operated (e.g. Flight Manual Supplement), and
- Details of how the modification complies with the applicable airworthiness and operational or airspace requirements.

1.4 There is no pre-defined format for the presentation of much of the information detailed in 1.3 (above), however the guidance in the following paragraphs should be taken into consideration when preparing the data pack. It is typical that a single 'modification document' would contain the definition and accomplishment information, with the ICA and airworthiness compliance details as separate sections, documents or attachments. The Flight Manual Supplement is always a separate document.

Appendices to this guidance provide illustrations of how some of the data could be presented.

Chapter 2

Definition of the minor modification

2.1 The minor modification must be clearly defined, addressing the following aspects:

- Unique identification (modification number),
- A concise, unambiguous, title,
- A description of the modification, and
- Aircraft type and model applicability.

2.2 The approval certificate for the modification will refer to a specific set of data. The applicant must therefore assign and identify **each individual document** associated with the modification with:

- A unique document number,
- A revision or issue status, and
- The date of the particular issue or revision.

It is useful if all documents and drawings associated with a modification are listed within a single document (typically incorporated within the 'modification document'), so that it may become the definition reference for the modification – similar in concept to a Master Data List.

2.3 The modification should be given a title that concisely describes the scope and purpose of the modification. Generic titles such as 'Avionics Upgrade' should be avoided and more specific titles such as 'Installation of Bloggs ELS123 Transponder to Comply with Elementary Mode S' should be used. This title should be reflected on the application form.

2.4 The modification document should include a brief, but complete, introductory description of the proposed modification, including:

- Details of what is being installed and where,
- Details of what is being removed,
- Details of interfaces to existing aircraft systems/equipment, and

- Details regarding the purpose of the modification (for example ‘to comply with Elementary Mode S requirements’ or ‘to qualify the navigation equipment for BRNAV operation i.a.w. AMC 20-4’).

2.5 The aircraft to which the modification is applicable must be fully detailed. This includes the aircraft type, any applicable model(s) of that type and the respective Type Certificate Data Sheet (or equivalent – noting that for some non-EASA aircraft, this may be a reference to the CAA Airworthiness Approval Note, or AAN). For example:

Aircraft Type:	DHC-1 Chipmunk, DHC-1A-1
Applicable Models:	DHC-1 Chipmunk Mk21; DHC-1 Chipmunk Mk22 and 22A; DHC-1 Chipmunk Mk23
AAN:	AAN1399; AAN4383; AAN5545

2.6 The type certification references for non-EASA aircraft are detailed within Section 1 of CAA document CAP 747 (Mandatory Requirements for Airworthiness).

2.7 It is usually permissible for a minor modification to be applicable to more than one aircraft model if the applicable models are covered by the same aircraft type approval (e.g. AAN) and it can be shown that the modification is compatible with that model – for example, where other models of the type have a similar instrument panel.

2.8 In some limited circumstances it may be permissible to extend the applicability beyond that of a single type approval (perhaps to include more than one aircraft type of a single manufacturer) but only where those aircraft are similar **with respect to the effect of the modification** (use a common instrument panel and have similar power supply arrangements and aircraft system interfaces, for example) and a common certification basis for the modification can be applied.

2.9 In some very limited circumstances applicability may be extended further, for example where the modification details the installation of one equipment type as a direct replacement for another (i.e. a ‘box swap’) with

very little or no associated mechanical or electrical modification (typically limited to a change of the mating electrical connector on the aircraft) to the aircraft or change in the use of the equipment.

The EASA policy on the extension of applicability for GA aircraft, which is detailed on the General Aviation FAQ page of the EASA website, can be referred to and would general be considered useful when considering modifications to UK-registered non-EASA aircraft.

NOTE: In any case, an extension of applicability beyond a single aircraft type must be justified at the time of modification approval application and the substantiation recorded on the modification document.

2.10 Where the modification is only applicable to a single aircraft, or finite group of aircraft within a model range, then the serial number(s) of the aircraft must be identified. As modified aircraft may change registries, it is not sufficient to refer to the aircraft by registration number(s) alone.

2.11 If there is any other limitation to the applicability, for example 'VFR Aircraft Only', then this must also be stated.

Chapter 3

Modification detail – Advisory information and accomplishment instructions

3.1 The modification document must fully describe the means by which the modification can be consistently embodied and provide any necessary supplementary advisory information. The modification document text may be supplemented by drawings or references to aircraft or equipment manufacturer's documentation as necessary. The accomplishment instructions will include, but not be limited to, details of:

- Verification that the existing aircraft configuration is compatible with the proposed design modifications before embodiment begins;
- Access or preparation work;
- Special precautions;
- Required tooling, test equipment or aircraft / equipment manufacturer's data;
- Parts to be manufactured;
- Parts or equipment to be fitted (by part number) including location and the associated methods of attachment/installation;
- Required materials;
- Modification to existing aircraft parts or structure;
- Required placards;
- Any necessary wiring. The wiring diagrams will include:
  - Wire type and size,
  - Wire, connector, earth point, switch etc. identification,
  - Screening and shielding information,
  - Circuit breaker types and rating,
  - Wire routing/installation information (i.e. standard practices).
- Any required testing, including that necessary to:
  - Confirm compliance with airworthiness or operational requirements (typically only done on first of type installations,

but may be necessary on subsequent installations for certain elements such as electrical load which will have to consider individual aircraft configurations),

- Confirm correct installation (e.g. wiring continuity / insulation / bonding or pressure / leak testing),
- Confirm proper function of installed equipment and any interfacing systems,
- Ensure that disturbed systems have been properly restored and are not adversely affected by the modification (including EMC interference checks).

3.2 Flight-testing it is not normally necessary for the certification of a minor modification. If it does become necessary, the modification may be re-classified Major, requiring a different application process.

3.3 The modification document should provide full details of the effect the modification has on the aircraft's weight and balance and the electrical load – showing that the neither the existing CoG range or the generator / busbar ratings are exceeded. See paragraphs 5.2 and 6.4 for further detail of compliance with CAA Generic Requirements for electrical load.

3.4 If the modification introduces anything that is subject to an Airworthiness Directive (AD) or Mandatory Permit Directive (MPD), then that effect should be highlighted. However, if the modification is introduced as a terminating action in response to an AD or MPD, the modication would be classified as Major, requiring a different application process.

3.5 If the modification includes optional content it should be 'parted' such that the embodiment of certain parts of the modification can be properly and separately recorded.

3.6 An example of acceptable modification parting, introduced in 3.5 above, would be to provide options for a Nav/Com to interface with different or optional indicators, displays or audio systems – where the Nav/Com provides the common element to the modification.

3.7 Alternatively, if the modification introduces separate and un-related features – such as the introduction of a transponder, an ELT and a DME – then the minor modification should be composed as a single (un-parted) minor modification or be split into separate minor modifications covered by separate approval applications. It should be noted that if the cumulative effect of the new features is ‘appreciable’ (see CAP 553 Appendix 2 to BCAR A8-21) then the modification might be re-classified as Major.

Chapter 4

Instructions for Continued Airworthiness

4.1 The modification data pack must provide information on how the continued airworthiness of the modified aircraft is assured. This data is commonly referred to as the Instructions for Continued Airworthiness (ICA).

4.2 The ICA will include the following elements:

- Instructions on the removal and installation of equipment which may fail or otherwise need replacement during service (including subsequent testing – which may not necessarily be the same test as that required during embodiment of the modification);
- Any instructions necessary for access;
- Instructions on and frequency of any required scheduled maintenance;
- Instructions on and parts required for any servicing (charging, lubrication etc.);
- Details of any tooling or test equipment;
- Details of any supplementary data such as equipment or aircraft manufacturers instruction manuals;
- Details of any Airworthiness Limitations.

4.3 This data should comply with the relevant airworthiness requirements (e.g. CS xx.1529 and the associated appendix). The instructions should be provided in the form of a manual or a supplement to an existing manual, be arranged in a practical manner and address each topic of the relevant ICA requirement, such as CS xx.1529 (as applicable). An example of an ICA document is given in Appendix C.

NOTE 1: The use of ‘xx’ above (and further within this guidance) refers to the appropriate EASA Certification Specification – i.e. CS 23 for small aeroplanes, CS 25 for large aeroplane, CS 27 for small rotorcraft, CS 29 for large rotorcraft etc.

NOTE 2: Appendix C is illustrative only. It does not constitute a template as the specific layout and information will vary from project to project.

4.4 It is not sufficient to only refer to specific existing aircraft maintenance programme for the scheduled maintenance aspects of continued airworthiness. The scheduled maintenance requirements must always be explicitly noted. Where such maintenance is covered by an existing maintenance programme entry, a note may be included in the ICA stating which particular task(s) of that programme cover the scheduled maintenance requirements introduced by the modification. An example is illustrated in Appendix C.

NOTE: Minor modifications approved by CAA on Non-EASA aircraft are only valid on UK registered aircraft.

Chapter 5

Operational instructions (including Flight Manual supplements)

5.1 The modification may introduce equipment or affect its usage which may require the provision of a supplement to the Aircraft/Rotorcraft Flight Manual or Pilots Operating Handbook to convey to the pilot/crew any necessary operating instructions, procedures or limitations. The supplements should be presented in a format similar to the parent A/RFM or POH.

5.2 Appendices to this guidance provide illustrations of common supplements:

- Appendix D CAP 747 GR No 4
- Appendix E CAP 747 GR No 6

NOTE: These appendices are illustrative only. They do not constitute templates as the specific information and layouts will vary from project to project.

Chapter 6

Recording compliance with applicable airworthiness and/or operational requirements

6.1 Applicants are required to demonstrate how the design modification complies with all of the applicable airworthiness (certification basis) and/or operational requirements plus any associated means of compliance material.

6.2 The certification basis applied is usually that specified in the Type Certification Data Sheet (TCDS) or AAN for the aircraft type. However, the applicant may elect to comply with later requirements for that particular class of aircraft (e.g. EASA CS 23) for the affected areas. The amendment status of the Certification Specifications or other airworthiness requirements used should be stated. See paragraph 2.5 regarding the identification of the applicable Type approval identification.

6.3 The applicable airworthiness requirements for the affected areas (i.e. those impacted by the design modification) should be identified from the certification basis and the corresponding details of how compliance has been demonstrated should be recorded. These statements of compliance should directly address the respective requirements. This can be recorded in a simple matrix. Appendix A illustrates how this can be presented using CS-23 Amendment 2 as an example.

For a design modification introducing equipment, the airworthiness requirements xx.1301, xx.1309 and xx.1529 (or equivalents of the applicable Certification Specification) are always applicable. In showing compliance with xx.1301 with regard to equipment, the respective equipment approval (ETSO or equivalent) and the manufacturer's Declaration of Design and Performance (DDP) should be quoted. With regard to xx.1309 compliance, the effect of the loss of function, malfunction of the system (e.g. display of misleading information) and the

effects on interfacing systems should be properly considered and recorded.

For those modifications that have a primary avionics/electrical content but also a secondary structural content (e.g. drilling holes in frames or fuselage, adding equipment racks etc.) then compliance with all relevant structural requirements must also be demonstrated.

NOTE: Appendix A is illustrative only. It is not the only means by which compliance can be shown and nor does it constitute a template as the applicable requirements and compliance statements will clearly vary from project to project. The list of applicable airworthiness requirements in the appendix is not complete and does not, for example, identify those relating to structural integrity. Similarly, the compliance statements in the appendix have been simplified.

6.4 Compliance with the applicable published guidance material (e.g. Techincal Guidance Leaflet), advisory material (e.g. FAA Advisory Circular or EASA AMC-20 Acceptable Means of Compliance) or other Certification Specifications (e.g. CS-ACNS) should also be recorded. Appendix B illustrates how this could be presented using the example of compliance with CS-ACNS for Elementary Surveillance.

NOTE: Appendix B is illustrative only. It is not the only means by which compliance can be shown and nor does it constitute a template as the compliance statements will clearly vary from project to project. The data contained in the appendix is not necessarily complete.

6.5 CAA Generic Requirements (GRs) are applicable to UK regustered aircraft **only**. They are **additional** to standard certification requirements, e.g. EASA CSs, FAA FARs, CAA BCARs etc., and are detailed within CAA publication CAP 747.

6.6 Where the GRs are applicable, typically for design modifications on GA aircraft introducing equipment, an electrical load analysis may need to be prepared to show compliance with GR No 4 (Electrical Generation Systems- Aircraft not Exceeding 5700kg Maximum Authorised Weight) or GR No 6 (Electrical Generation Systems - Bus-bar Low Voltage Warning

Single-Engined Aircraft) as applicable. The modification document must record how continued compliance with GR No 4 or GR No 6 is achieved. A new Flight Manual Supplement may be required (see paragraph 5.2).

Further guidance on compliance with GR No 4 and GR No 6 is given in CAP 562 (Civil Aircraft Airworthiness Information and Procedures) Leaflets 24-30 and 24-50 respectively.

6.7 In the case of GR4 and GR6, compliance with these does not preclude the need to demonstrate full compliance with the relevant certification basis. For example, where the certification basis of the modification is CS23 (of any amendment), then compliance with CS 23.1351(a) and CS 23.1353(h) should be clearly demonstrated and recorded (see paragraph 6.3).

Chapter 7

Approval of standard modifications and repairs in accordance with CS-STAN

7.1 EASA has published CS-STAN, Certification Specifications for Standard Changes and Repairs. It provides a simplified means to embody certain modifications (which it refers to as design changes) and repairs on certain classes of light aircraft in accordance with the approved instructions contained within CS-STAN. Aircraft class applicability is detailed in Part 21.A.90B(a) and 21.A.431B(a) in EASA terminology as aeroplanes of 5700 kg or less, rotorcraft of 3175 kg or less and ELA1/ELA2 sailplanes, balloons and airships. The applicability of some particular changes or repairs may be further restricted, and the aircraft release to service after implementation of a SC/SR is managed in accordacne with Part M.

7.2 CAA recognises that CS-STAN could provide an acceptable approach for standard modifications and repairs for CAA Regulated UK-registered non-EASA aircraft that fall within the scope of each standard change and repair as defined within subpart B and C of CS-STAN. In general, these can be applicabile to UK registered Non-EASA aircraft that are regulated by the CAA; that are aeroplanes of 5700 kg or less; rotorcraft 3175 kg or less; sailplanes of 2000kg or less; balloons; hot air airships, or; gas airships of 3% maximun static heaviness, non-vectored thrust (except reverse), conventional and simple design (structure, control system and ballonet system) and non power assisted controls).

7.3 If embodied in accordance with CS-STAN, the modification or repair requires no further approval from CAA, so the approval application process described in the introduction to this document need not apply.

7.4 The changes in CS-STAN include the installation of VHF radios, transponders and some instruments, plus other simple modifications and

repairs. The approval can even include the associated Flight Manual Supplement.

7.5 Because the modifications to UK-registered non-EASA aircraft are unlikely to involve a Part M organisation, each embodiment of a ‘standard change’ or repair on a UK-registered Non-EASA aircraft will require the compilation of CAA Form 123 (instead of the EASA Form 123) as presented within Annex 1. This must be kept as part of the aircraft records. This straightforward form will record how the modification or repair complied with CS-STAN including details of parts fitted. Each CAA Form 123 is only applicable to one aircraft, so further forms must be compiled for any subsequent aircraft.

7.6 CAA Form 123 details how CS-STAN can be used (including guidance on compilation) and the means to use this in support of the aircraft release to service. It is contained in Appendix F

Appendix A

Example airworthiness requirements compliance statement based on CS-23 for a minor modification submission for UK registered Non-EASA GA aircraft

This example is for illustrative purposes only. More complex modifications or those affecting other aspects of the aircraft will require details of compliance with other/additional requirements.

Requirement reference CS-23 amdt 3 paragraph	**Requirement**	**Compliance**
23.1301(a) (c)	Installed equipment to be of a design appropriate to its intended function Be installed according to specified limitations	*COMPLIANT* *Bloggs Avionics Transponder p/n 12345-1 is approved to ETSO-2C112d and meets all requirements of CS-ACNS.D.ELS.* *Wiring, switches and circuit breakers meet specifications for aerospace applications.* *DDP identifies no limitations or ETSO deviations that would affect this installation. The stated test categories of DO-160G environmental qualification are appropriate for this application.* *Reference: Bloggs DDP ABCDE-1 Issue 3*

Requirement reference CS-23 amdt 3 paragraph	**Requirement**	**Compliance**
23.1301 (b) 23.1309(b)(1)	Be labelled as to its identification or function	*COMPLIANT* *All equipment, switches, ground points, circuit breakers and wire bundles appropriately labelled.* *References: Wiring Diagram 12345-1* *Installation drawing 12345-2*
23.1301 (d)	Function properly when installed	*COMPLIANT* *System is fully tested by ground tests on completion. Flight test is not required.* *References: Paragraph 3 of accomplishment instructions 12345-1.*
23.1309 (a)	System must not adversely affect existing systems	*COMPLIANT* *The system does not interface with any other system except dedicated altitude encoder.* *Installation is physically separate from other systems.* *EMI tests conducted.* *References: Wiring Diagram 12345-1* *Installation drawing 12345-2* *Paragraph 3 of accomplishment instructions 12345-1*

Requirement reference CS-23 amdt 3 paragraph	**Requirement**	**Compliance**
23.1309 (b)(2)	Effect on continued safe flight	*COMPLIANT* *System not required for continued safe flight. Worst case failure modes (loss of function, erroneous data) assessed as 'minor' per AC 23.1309-1D.* *References: AC 23.1309-1D*
23.1309 (e)	Electrical power systems and equipment design/installation environment	*COMPLIANT* *Modification introduces transponder installed in lieu of removed system only. Existing antenna used. No change to direct lightning effect. See 23.1301 for transponder environmental qualification.* *All equipment bonded i.a.w. aircraft manufacturer's standard practice.* *References: Installation drawing 12345-2* *Paragraph 2 of accomplishment instructions 1234-1*

Requirement reference CS-23 amdt 3 paragraph	**Requirement**	**Compliance**
23.1351(a)	Electrical system capacity	*COMPLIANT* *Existing 3 A c/bkr used supplying nominal 2.2A load. Wire gauge 20 appropriate.* *Main Bus capacity 95VA – new equipment introduces additional load of 1 A.* *Battery endurance re-calculated and found to be 43 minutes.* *References: Paragraph 6 of accomplishment instructions 1234-1 (Electrical Load Analysis).*
23.1353(h)	Storage battery design and installation	*COMPLIANT* *Battery endurance re-calculated and found to be 43 minutes.* *References: Paragraph 6 of accomplishment instructions 1234-1 (Electrical Load Analysis).*
23.1357	Circuit protection devices	*COMPLIANT* *Existing trip free c/bkr used.* *References: Wiring Diagram 12345-1*

Requirement reference CS-23 amdt 3 paragraph	**Requirement**	**Compliance**
23.1365	Electric cables and equipment	*COMPLIANT* *Wire type xyz is suitable for airframe applications. Also refer to statement for 23.1351 above for equipment.*
23.1431	Electronic equipment	*COMPLIANT* *EMI tests carried out post-installation.* *References: Paragraph 3 of accomplishment instructions 12345-1.*
23.1529	Instructions for Continued Airworthiness	*COMPLIANT* *Maintenance instructions provided. Content and format i.aw. CS-23 Appendix G.* *References: ICA Document 123-1*
23.xxxx	xxxx	*And so on…*

NOTE: The following GR 6 compliance data is relevant to the applicable UK-registered aircraft.

Generic Requirement GR 6 reference	**Requirement**	**Compliance**
Paragraph 2.2	A clear and unmistakable red visual warning of the battery supporting all or part of the electrical load	*COMPLIANT* *A red annunciator is installed to indicate when the busbar voltage drops below a 12V voltage threshold. This would not be lit when the engine alternator is operating.*
Paragraph 3.2	Battery duration not less than 30 minutes	*COMPLIANT* *Battery endurance re-calculated post-embodiment i.a.w. CAP 562 Leaflet 24-50 and found to be 43 minutes.* *References: Paragraph 6 of accomplishment instructions 1234-1 (Electrical Load Analysis)*

Appendix B

Replacement transponder Elementary Mode S compliance statement used for a minor modification submission for UK registered Non-EASA GA aircraft

This example is for illustrative purposes only. More complex modifications or those affecting other aspects of the aircraft will require details of compliance with other/additional requirements.

Requirement reference	Requirement	Compliance
CS-ACNS initial issue ACNS.D.ELS.010	**Transponder characteristics** a) Transponder capabilities b) ACAS compatibility c) Output power >15000'/175kts d) Output power <15000'/175kts	*COMPLIANT* *Bloggs Avionics Transponder Type ELS123, p/n 12345-001.* *All elements in AMC addressed.* ▪ *Holds ETSO-C112d* ▪ *Class 2 (power output for a/c @ <15,000 + <175 kts)* ▪ *SI code capable* ▪ *'I' designated capability for ELS* ▪ *ACAS capable (but not fitted)* *References: Bloggs Avionics Declaration of Design and Performance (DDP) 12345-A dated 31 December 2016*

Requirement reference	Requirement	Compliance
ACNS.D.ELS.015	**Data transmission** a) Data ▪ Mode A ▪ Pressure altitude ▪ On ground status ▪ Aircraft ID ▪ SPI ▪ Emergency status ▪ Datalink capability report ▪ ICAO 24-bit address ▪ ACAS RA Report b) Other transmission	*COMPLIANT* a) *Bloggs Avionics Transponder Type ELS123 provides parameters listed in para (a).* *Verified in Minor Modification accomplishment instructions 12345-1.* b) *No other parameters transmitted.*
ACNS.D.ELS.020	**On ground determination** a) Not manual b) Auto	*COMPLIANT* *On the ground status permanently set in transponder settings. WoW, airspeed, Rad Alt not available for auto.*

Requirement reference	Requirement	Compliance
ACNS.D.ELS.025	**Altitude Source** a) Approved source b) Resolution c) Common source	*COMPLIANT* *Encoding altimeter not fitted on this aircraft. Dedicated ACME Avionics Altitude Encoder p/n 4321-001 provides altitude data in Gillham format to the Transponder to a resolution of 100ft. The Altitude Encoder is fed from the same static source as the pilot's altimeter. Encoded altitude readout is available on Transponder display.*
ACNS.D.ELS.030	**Flight Deck Interface** a) In-flight control and display b) Not in-flight control	*COMPLIANT* *All controls and parameter display required by para (a) provided on transponder.* *No means to inhibit pressure altitude info.* *ICAO 24-bit can only be accessed on ground in transponder set-up menus.*
ACNS.D.ELS.040	**Integrity** Commensurate with a minor failure condition	*COMPLIANT* *Bloggs Avionics Transponder Type ELS123, p/n 12345-001 developed to DAL C.* *ACME encoder p/n 4321-001 ETSO'd DAL C.* *References: Bloggs Avionics Declaration of Design and Performance (DDP) 12345-A dated 31 December 2016* *ACME Avionics Altitude Encoder DDP ABCDE dated 31 December 2015*

Requirement reference	Requirement	Compliance
ACNS.D.ELS.045	**Continuity** Qualitative probability of remote	*COMPLIANT* *All LRUs of the system are ETSO'd, aircraft standard wiring practices are followed and electrical power is from main electrical bus. Continuity is at maximum extent possible on this aircraft type.*
ACNS.D.ELS.050	**Dual/Multiple transponder installation** Simultaneous operation must be prevented	*COMPLIANT* *Only one transponder installed.*
ACNS.D.ELS.055	**ICAO 24-bit address**	*COMPLIANT* *ICAO 24-bit address (Hex xxxxxx) as assigned by UK CAA*
ACNS.D.ELS.060	**Antenna Installation** a) Radiation pattern b) Effect of structure	*COMPLIANT* *Not changed. Original antenna as installed at aircraft build re-used.*
ACNS.D.ELS.065	**Antenna Diversity** Aircraft >5700 kg, TAS >250 kts requires diversity antenna	*COMPLIANT* *Not required. Aircraft <5700 and max cruising TAS <250 kts.* *References: Piper POH xxxxx*

Appendix C

Example instructions for continued airworthiness document based on compliance with CS-23.1529 appendix G

This example is for illustrative purposes only. More complex modifications or those affecting other aspects of the aircraft will require details of compliance with other/additional requirements.

Instructions for continued airworthiness

Anybody Aviation Services minor modification 12345

Installation of Bloggs Avionics ELS123 Transponder on Piper PA28-800X

Anybody Aviation Services document ICA123 Iss x, dd/mm/yyyy

1. Description

Anybody Aviation Services minor modification 12345 installs a Bloggs Avionics Mode S Transponder to comply with the requirements for Elementary Mode S carriage. The Transponder is installed in the instrument panel radio stack to replace the Mode A/C Transponder. It interfaces with the existing blind altitude encoder and uses the existing antenna on the upper fuselage at Frame 25.

This document describes the necessary maintenance requirements and instructions necessary to ensure the continued airworthiness of this aircraft following embodiment of Aviation Services minor modification 12345.

This ICA document is prepared i.a.w. Anybody Aviation Services minor modification 12345. Any change to this ICA will require further approval.

EASA AD yyyy-nnnn remains applicable to this aircraft post installation of Aviation Services minor modification 12345. Section 4a of this document refers.

2. Operation

Operating instructions for the Bloggs Avionics Mode S Transponder are detailed in the following documents:

- Bloggs Avionics ELS123 Pilots Operating Guide, ELS123-001 Rev A
- Section B of Bloggs Avionics ELS123 Installation Manual, ELS123-002 Rev B

3. Servicing

No servicing or consumables parts/materials required.

No special access requirements.

4. Maintenance instructions

4a. Scheduled maintenance

Every 12 months:

Using a field test set, check the Mode S Transponder is responding to interrogations properly and operating within the design limits i.a.w. Section C of Bloggs Avionics ELS123 Installation Manual, ELS123-002 Rev B:

- frequency tolerance
- side lobe suppression
- Mode A,'C and S response including confirmation that the assigned aircraft address (24-bit address) is correctly configured

NOTE: For UK-registered aircraft maintained i.a.w. LAMP (CAP 766 CAA/LAMP/A/yyyy Issue x), item 123 of the Annual Check completely satisfies this requirement.

Every 12 months **(mandatory)**:

Check the altitude encoder – transponder Gillham Code interface i.a.w. EASA AD yyyy-nnnn.

4b. Installation and removal instructions

Removal:

- Remove aircraft power and Trip ‘XPDR’ c/b.
- Using ¼ inch Allen Key, loosen two holding screws and withdraw transponder from stack.
- Disconnect and secure wafer connector and antenna connector.

Installation:

- Reverse removal instructions (above).
- Test i.a.w. Section C of Bloggs Avionics ELS123 Installation Manual, ELS123-002 Rev B. Note only steps 1 through 3 of Section C are required. It is not necessary to complete Section C.

4c. Trouble-shooting

Trouble-shooting for the Bloggs Avionics Mode S Transponder is detailed in Section E of Bloggs Avionics ELS123 Installation Manual, ELS123-002 Rev B.

For reference to aircraft installation specific aspects of trouble-shooting, refer to the following drawings of Anybody Aviation Services minor modification 12345:

- Wiring Diagram 12345-1
- Installation Drawing 12345-2

4d. Required tools and test equipment

- Test Box 123 L-Band Test Set (or equivalent)
- Test Box 456 Pitot-Static Test Set (or equivalent)

5. Airworthiness limitations

The airworthiness limitations section is approved and variations must also be approved.

There are no Airworthiness Limitations applicable to Anybody Aviation Services minor modification 12345.

Appendix D

Example CAP 747 GR 4 AFM supplement

<ORGANISATION IDENTIFICATION>

Supplement no.:	<xxxxx>	**Issue:**	<xx>
Aircraft type:	<xxxxxxxx>		
Registration mark:	<xxxxxx>	**Aircraft serial no.:**	<xxxxxxx>

ADDITIONAL LIMITATIONS AND INFORMATION FOR CERTIFICATION FOR COMPLIANCE WITH CAP 747 MANDATORY REQUIREMENTS FOR AIRWORTHINESS – GENERIC REQUIREMENT No.4

The limitations and information contained herein either supplement or, in the case of conflict, override those in the flight manual.

LOW BUS VOLTS WARNING

A steady/flashing warning light is installed which will illuminate if the output of the generators/alternators reduces to a level where the battery supplies power to the bus bar.

NORMAL PROCEDURES

Before engine start

Gen/Alt 1 and 2	-	OFF
Battery	-	ON
Check low volts warning light	-	ON

After engine start

Gen/Alt 1 and 2	-	ON
Battery	-	ON
Check low volts warning	-	OFF

EMERGENCY PROCEDURES

If warning light illuminates during flight

1. Check Gen/Alt 1 and 2 ammeters.
2. If both read zero - Switch OFF all electrical services except:

   Internal lights
   Instrument lights
   Engine instruments
   Warning lights
   VHF COMM No.1
   VHF NAV
   Turn and slip indicator (pilot)
   Landing light
   Undercarriage operation
   Undercarriage warning

3. Restrict VHF communication transmission to 3 minutes maximum during the flight.
4. Land as soon as possible.

Note: Battery duration will be at least 30 minutes. Other electrical services may be used at the pilot's discretion, but the battery duration will be reduced pro-rata.

Applicable minor mod: .....

CAA approval number for non-EASA minor modifications: .....

Date: ..... .

Appendix E

Example CAP 747 GR 6 AFM supplement

<ORGANISATION IDENTIFICATION>

Supplement no.:	<xxxxx>	**Issue:**	<xx>
Aircraft type:	<xxxxxxxx>	**Registration mark:**	<xxxxxx>
Aircraft serial no.:	<xxxxxxx>		

ADDITIONAL LIMITATIONS AND INFORMATION FOR CERTIFICATION FOR COMPLIANCE WITH CAP 747 MANDATORY REQUIREMENTS FOR AIRWORTHINESS – GENERIC REQUIREMENT No.4

The limitations and information contained herein either supplement or, in the case of conflict, override those in the flight manual.

LOW BUS VOLTS WARNING

A steady/flashing warning light is installed which will illuminate if the output of the generator/alternator reduces to a level where the battery supplies power to the bus bar.

NORMAL PROCEDURES

Before engine start

Generator(s)/Alternator(s)	-	OFF
Battery	-	ON
Check low volts warning light	-	ON

After engine start

Generator(s)/Alternator(s)	-	ON
Battery	-	ON
Check low volts warning	-	OFF

Note: Warning may illuminate with low engine rpm. Check it goes out when engine rpm is increased.

EMERGENCY PROCEDURES

If warning light illuminates during flight

1. Switch OFF all electrical services except:
   - Internal lights
   - Instrument lights
   - Engine instruments
   - Warning lights
   - VHF COMM No.1
   - VHF NAV
   - Turn and slip indicator (pilot)
   - Landing light
   - Undercarriage operation *[if applicable]*
   - Undercarriage warning *[if applicable]*
2. Restrict VHF communication transmission to 3 minutes maximum during the flight.
3. Land as soon as possible.

Note: Battery duration will be at least 30 minutes. Other electrical services may be used at the pilot's discretion, but the battery duration will be reduced pro-rata.

Applicable minor mod: .....

CAA approval number for non-EASA minor modifications: .....

Date: ..... .

Appendix F

UK Registered Non-EASA Aircraft Certificate of Release to Service after embodiment of a Standard Change or a Standard Repair

This appendix presents the means to enable the Aircraft Certificate of Release to Service after embodiment of a Standard Change or a Standard Repair (SC/SR). It is intended that this will be incorporated into the relevant section of BCAR A (e.g. A6-1, A8-23 and A8-24) and will follow the approach presented in the AMC to Part-M (AMC M.A.801), but using CAA Form 123 (overleaf) as the SC/SR embodiment record instead of the EASA Form.

Note that the CAA Form 123 is also available on our website as SRG 1759.

General description

1. With reference to AMC M.A.801, where the EASA AMC text mentions Agency or Competent Authority, this should be read as the UK CAA.

2. Where EASA AMC paragraphs refer to 'Member State', those paragraphs may not be applicable to BCAR approvals. If there is any doubt, the CAA should be consulted.

3. Where the EASA AMC text refers to Part M, reference should be made to the approval in reference to the appropriate chapter of BCAR A (e.g. A6-1, A8-23 and A8-24).

Table 1: Applicability of individual Part M, AMC to BCAR maintenance requirements.
This is proposed as an addition to Table 1 of A6-1 Appendix 1, A8-23 Appendix 1 and A8-24 Appendix 1.

Part M reference number	BCAR section A reference number	Subject	Applicable / not applicable to BCAR A
AMC M.A.801	A6-1 paragraph 11, A8-23 paragraph 12, A8-24 paragraph 16	Standard Change/ Standard Repair (SC/SR) embodiment record	Use CAA Form 123, in lieu of EASA Form 123

CAA Form 123 (SRG1759) Issue 00

Standard Change/Standard Repair (SC/SR) embodiment record

CAA Form 123 — Standard Change/Standard Repair (SC/SR) embodiment record	1. SC/SR number(s):
2. SC/SR title & description:	
3. Applicability:	
4. List of parts (description/Part-No/Qty):	
5. Operational limitations/affected aircraft manuals. Copies of these manuals are provided to the aircraft owner:	
6. Documents used for the development and embodiment of this SC/SR: * Copies of the documents marked with an asterisk are handed to the aircraft owner.	
7. Instructions for continuing airworthiness. Copies of these manuals are provided to the aircraft owner:	
8. Other information:	
9a. ☐ This SC complies with the criteria established in CAP1419 para 7.2 and with the relevant paragraphs of CS-STAN.	
9b. ☐ This SR complies with the criteria established in CAP1419 para 7.2 and with the relevant paragraphs of CS-STAN.	
10. Date of SC/SR embodiment:	11. Identification data and signature of the person responsible for the embodiment of the SC/SR:
12. Signature of the aircraft owner. This signature attests that all relevant documentation is handed over from the issuer of this form to the aircraft owner, and, therefore, the latter becomes aware of any impact or limitations on operations or additional continuing airworthiness requirements which may apply to the aircraft due to the embodiment of the modification/repair.	

Notes

Original remains with the legal or natural person responsible for the embodiment of the modification/repair as a SC/SR.

The aircraft owner should retain a copy of this form.

The aircraft owner should be provided with copies of the documents referenced in boxes 5 and 7 and those in box 6 marked with an asterisk '*'.

The 'relevant paragraphs' in boxes 9a and 9b refer to the applicable paragraphs of 'Subpart A – General' of CS-STAN and those of the SC/SR quoted in box 2.

For box 12, when the aircraft owner has signed a contract i.a.w. BCAR A6-1 supplement 1 and A8-25, it is possible that the Continuing Airworthiness Management Organisation (CAMO) representative signs box 12 and provides all relevant information to the owner before next flight.

Completion instructions

Use English to fill in the form.

1	Identify the SC/SR with a unique number and reference this number in the aircraft logbook.
2	Specify the applicable EASA CS-STAN chapter including revision (e.g. CS-SCxxxy or CS-SRxxxy) & title. Provide also a short description.
3	Identify the aircraft (a/c) registration, serial number and type.
4	List the parts' numbers and description for the parts installed. Refer to an auxiliary document if necessary.
5	Identify affected aircraft manuals.
6	Refer to the documentation developed to support the SC/SR and its embodiment, including design data required by the CS-STAN: design definition, documents recording the showing of compliance with the Certification Specifications or any test result, etc. The documents' references should quote their revision/issue.
7	Identify instructions for continuing airworthiness that need to be considered for the aircraft maintenance programme review.
8.	To be used as deemed necessary by the installer.
9a / 9b.	Tick relevant box only.
10 / 12	Self-explanatory.
11	Give full name details and certificate reference (of the natural or legal person) used for issuing the aircraft release to service.