European Union Aviation Safety Agency

Certification Specifications

for

Standard Changes

and

Standard Repairs

CS-STAN

ACCEPTABLE METHODS, TECHNIQUES AND PRACTICES FOR CARRYING OUT AND IDENTIFYING STANDARD CHANGES AND STANDARD REPAIRS (SCs/SRs) AS PERMITTED IN PART 21

Issue 3

4 April 2019[1]

[1] For the date of entry into force of this Issue, please refer to Decision 2019/010/R in the Official Publication of EASA.

CS-STAN

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NOTE: To support the identification of improvements to CS-STAN and support its future evolution, EASA would appreciate stakeholders' voluntary feedback through the EASA website[2]

[2] https://www.easa.europa.eu/easa-and-you/general-aviation

SUBPART A — GENERAL

CS STAN.00 Scope

These certification specifications for SCs/SRs contain design data with acceptable methods, techniques, and practices for carrying out and identifying SCs/SRs. SCs/SRs, designed in compliance with these certification specifications, are not subject to an approval process, and, therefore, can be embodied in an aircraft when the conditions set out in the relevant paragraphs of Part-21[3] for SCs/SRs, i.e. 21.A.90B or 21.A.431B, are met.

Subpart B and Subpart C contain a list of standard changes and repairs permitted under 21.A.90B or 21.A.431B. Other changes/repairs not included in these subparts cannot be considered as SCs/SRs. In particular CS-STAN cannot be used to install or exchange integrated avionic or navigation systems, unless explicitly allowed.

Acceptable means of compliance for the release to service of aircraft modified or repaired through embodiment of SCs or SRs are provided in AMC.M.A.801. Additional limitations are introduced in certain SCs/SRs depending on their complexity for example the 'pilot owner' is often not allowed to release the aircraft into service.

Note: Standard Changes and Standard Repairs are not meant to be used in serial production.

CS STAN.05 Embodiment of current SCs/SRs

As CS-STAN evolves, some SCs/SRs are amended, and their revision status is increased (e.g. CS-SC.XXXa is replaced with CS-SC.XXXb). In this respect, the new SC/SR version (in the example, CS-SC.XXXb) is the only one that is current and acceptable, and the old SC/SR version (in the example CS-SC.XXXa) becomes no longer acceptable for new embodiments.

Therefore, the following principles apply:

— It is mandatory to install the SC/SR using the latest revision that has been published.

— Always refer to the revision of the SC/SR in EASA Form '123'.

Note: A change or repair that was embodied against an older version of the relevant SC/SR, which was in force at the time of the embodiment, remains valid when a new revision of the SC/SR demands more conditions to be met, unless EASA mandates additional considerations by means of an airworthiness directive (AD).

CS STAN.10 Applicability

In addition to the conditions of 21.A.90B and 21.A.431B, for each SC/SR, these Certification Specifications may further restrict its applicability to certain aircraft, or to some areas of an aircraft, or to certain aircraft operations.

CS STAN.20 Operational Limitations or restrictions

SCs/SRs, as described in these certification specifications, may contain operational limitations or restrictions with regard to the use of an aircraft instrument/equipment.

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[3] Annex I to Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations and repealing Commission Regulation (EC) No 1702/2003 (OJ L 243, 27.9.2003, p. 6).

Equipment installed as part of an SC cannot be used to eliminate or reduce the existing airworthiness limitations and operational limitations of the aircraft (e.g. an aircraft certified only for VFR operation cannot be authorised to operate IFR as a result of modifications embodied through CS-STAN).

As a consequence, an SC might introduce limitations on the use of the installed equipment (e.g. a navigation equipment may be installed following an SC, but this installation may not permit that the equipment is used as a primary navigation means if the functionality did not exist before the change was embodied).

Any restriction or limitation applicable due to the embodiment of the SC/SR is included in the aircraft manuals or records, as necessary, and in EASA Form 123.

CS STAN.30 Changes/Repairs that are not in conflict with TC holders' data

Each SC/SR has an applicability independent of the aircraft type and can be embodied in/on an aircraft type unless the SC/SR is in conflict with any information or limitation given by the TC holder as part of the approved aircraft flight manual (AFM), or the approved sections of the instructions for continued airworthiness (ICA).

In case of conflict between Airworthiness Directive (AD) provisions and Standard Changes or Repairs, the AD takes precedence.

CS STAN.40 Referenced documents

The acceptable methods, techniques and practices contained in these Certification Specifications may refer to other documents. Design and production considerations or operational restrictions/limitations established in these documents are applicable unless otherwise stated and, therefore, may further restrict the applicability of the SC/SR. The same applies to other documents referred to in these aforementioned referenced documents. Any restriction or limitation established in the referenced document, directly or 'in cascade', affecting the operation or airworthiness of the aircraft, is included in the aircraft manuals or records, as necessary, and in Form 123.

Other references mentioned in these documents and quoted 'as example', 'for information', etc. are to be considered, but the installer must ensure that the example or information is applicable to the design being undertaken and not in contradiction with TC holders data before using it.

The latest available versions of the third-party references should be considered unless otherwise stated by the Agency.

References to other (e.g. foreign) legislation in the referenced documents are not applicable and are replaced by the relevant European rules (e.g. approval process described in FAA Advisory Circular AC 43.13 to obtain an FAA field approval should be ignored and, instead, the installer should follow the European rules).

CS STAN.50 Instructions for Continuing Airworthiness

Due to the SC/SR being embodied, the aircraft instructions for continuing airworthiness may need to be updated. This update is considered to be part of this SC/SR, and, therefore, requires no specific approval.

CS STAN.60 Aircraft Flight Manual Supplement (AFMS)

Due to the SC/SR being embodied, the AFM may need to be updated. This manual supplement is considered to be part of this SC/SR, and, therefore, requires no specific approval.

CS STAN.70 Acceptable Means of Compliance (AMC)

AMC for the release to service of the aircraft after embodiment of the SC/SR, the eligibility of the persons entitled to this release, the parts and appliances suitable for use in a SC/SR and their identification, the documents to be produced and kept with the change/repair, the required amendment to aircraft manuals, the EASA Form 123 (change/repair embodiment record), etc. are contained in AMC M.A.801 in Annex I to Decision No 2003/19/RM.

CS STAN.80 Definitions and abbreviations

'AC' means advisory circular.

'AD' means airworthiness directive.

'ADF' means airborne automatic direction finding.

'ADS-B' means automatic dependent surveillance — broadcast.

'AEH' means airborne electronic hardware.

'AFCS' means automatic flight control system.

'AFM(S)' means aircraft flight manual (supplement).

'AMC' means acceptable means of compliance.

'AoA' means angle of attack.

'CS' means certification specification.

'CO' means carbon monoxide.

'DC' means direct current.

'DC-PSS' means direct current power supply system.

'ELA1 and ELA2 aircraft' means a manned European light aircraft, as defined in Regulation (EU) No 748/2012. An aircraft may comply with both ELA1 and ELA2 definitions, and, therefore, be classified as per both ELA1 and ELA2 categories of aircraft.

'EMI' means electromagnetic interference.

'ETSO equivalent' an article is equivalent to an authorised ETSO article if it is grandfathered (e.g. JTSO) in accordance with Article 6 of Regulation (EU) No 748/2012, or if it has been accepted in accordance with provisions of international bilateral safety agreements.

'Exchange' means the substitution of an existing equipment or instrument (or parts of a system) with a different one with a different part number which provides the same functionality/information.

'FAA' means Federal Aviation Administration.

'FMS' means flight management system.

'GA' means general aviation.

'GNSS' means global navigation satellite system such as GPS, Galileo, etc.

'GPS' means global positioning system.

‘IAS’ means international standard atmosphere.

‘ICA’ instructions for continued airworthiness.

‘IFR’ means instrument flight rules.

‘IMC’ means instrumental meteorological conditions.

‘Installation’ means the embodiment in/on the aircraft of an item of equipment, an instrument or a system. Unless otherwise mentioned, whenever an SC covers an ‘installation’ of an item of equipment/an instrument/a system, the exchange of the item of equipment/instrument/system is also covered by the same SC.

‘ISA’ means international standard atmosphere.

‘LED’ means light-emitting diode.

‘LSA’ means light sport aeroplane.

‘MEL’ means minimum equipment list.

‘MFD’ means multifunctional displays.

‘MTOM’ means maximum take-off mass.

‘NACp’ means navigation accuracy category for position.

‘NTO’ means non-technical objection.

‘NVG’ means night-vision goggles.

‘NVIS’ means night vision imaging system.

‘PED’ means portable electronic device.

‘Pilot-owner’ means a person qualified in accordance with M.A.803 (a) of Annex I (Part-M) of Regulation (EU) No 1321/2014.

‘POH’ means pilot operating handbook.

‘PSS’ means power supply system.

‘SC’ means standard change.

‘SR’ means standard repair.

‘SDA’ means system design assurance.

‘SIB’ means safety information bulletin.

‘SIL’ means source integrity level.

‘SMM’ means structural maintenance manual.

‘TABS’ means traffic awareness beacon system:

A Class A TABS:

— includes the transponder, an altitude source, and ADS-B OUT functionality; refer to ETSO-C199, subparagraphs (1), (2), and (3);

— consists of a Class A device, or a TSO-C112e- and TSO-C166b-compliant device.

A Class B TABS:

— includes the global navigation satellite system (GNSS) position source functionality; refer to ETSO-C199, subparagraph (4);

— consists of a Class B device, or an ETSO-C129a (cancelled), ETSO-C145c or later revision, ETSO C146c or later revision, or ETSO-C196b-compliant GPS.

‘TAS’ means: traffic advisory system; true air speed (depending on context).

‘(S)TC’ means (supplemental) type certificate.

‘TCAS’ means traffic alert and collision avoidance system.

‘TCDS’ means type certification data sheet.

‘VFR’ means visual flight rules.

‘VLA’ means very light aeroplane.

‘VOR’ means VHF omnidirectional radio.

SUBPART B — STANDARD CHANGES

LIST OF STANDARD CHANGES

Group Systems — Communication:

CS-SC001a — Installation of VHF voice communication equipment

CS-SC002c — Installation of Mode S elementary surveillance equipment

CS-SC003c — Installation of audio selector panels and amplifiers

CS-SC004a — Installation of antennas

SC-SC005a — Installation of an ADS-B OUT system combined with a transponder system

Group Systems — Electrical:

CS-SC031b — Exchange of conventional Anti-Collision Lights, Position Lights and Landing & Taxi lights by LED-type lights

CS-SC032b — Installation of anti-collision lights

CS-SC033a — Installation of cabin and cockpit conventional lights by LED-type lights

CS-SC034b — Exchange of an existing battery for a lithium iron phosphate ($LiFePO_4$) battery system

CS-SC035a — Installation of solar cells on sailplanes

CS-SC036a — Installation of visual awareness lights

CS-SC037a — Exchange of a main aircraft battery

CS-SC038a — Installation of DC to DC converters

Group Systems — Avionics/NAV/Instruments:

CS-SC051c — Installation of 'FLARM' equipment

CS-SC052c — Installation of VFR GNSS equipment

CS-SC053b — Installation of Radio Marker Receiving equipment

CS-SC054b — Exchange of Distance Measurement Equipment (DME)

CS-SC055b — Exchange of ADF equipment

CS-SC056b — Exchange of VOR equipment

SC-SC057a — Reserved

SC-CS058a — Installation of traffic awareness beacon system (TABS) equipment

Group Systems — Mechanical and structural:

CS-SC081a — Exchange of tyres (inner tubes/outer tyres)

CS-SC082a — Exchange of skids on wing tips/fuselage tails

CS-SC083a — Exchange of flexible seals on control surfaces

CS-SC084a — Repainting of composite aircraft structures

CS-SC085a — Exchange of an aircraft livery paint and decorative sticker scheme

CS-SC086a — Exchange of a balloon ‘bottom-end’

Group Cabin:

CS-SC101b — Installation of emergency locator transmitter (ELT) equipment

CS-SC102a — Installation of DC power supply systems (PSS) for portable electronic devices (PED)

CS-SC103a — Exchange of interior material covering floor, sidewall and ceiling

CS-SC104a — Installation of lightweight in-flight recording systems

CS-SC105a — Installation of mounting systems to hold equipment

CS-SC106a — Installation of flight time recorders

CS-SC107a — Installation of carbon monoxide detectors

Group Survivability Equipment:

CS-SC151b — Installation of headrests

CS-SC152b — Changes to seat cushions including the use of alternative foam materials

CS-SC153b — Exchange of safety belts — torso restraint systems

Group Powerplant and fuel systems:

CS-SC201b — Exchange of powerplant instruments

CS-SC202b — Use of Avgas UL 91

CS-SC203b — Use of Avgas Hjelmco 91/96 UL and 91/98 UL

CS-SC204a — Installation of external powered engine preheater

CS-SC205a — Installation of fuel low-level sensor (FLLS)

CS-SC206a — Exchange of fixed-pitch wooden propellers

CS-SC207a — Exchange of the fuel cylinders on hot-air balloons

Group Flight:

CS-SC251b — Installation of an angle-of-attack (AoA) indicator system

Group Miscellaneous:

CS-SC401c — Exchange of basic flight instruments

CS-SC402b — Installation of sailplane equipment

CS-SC403a — Provisions for the installation of lightweight cameras

Standard Change CS-SC001a

INSTALLATION OF VHF VOICE COMMUNICATION EQUIPMENT

1. Purpose

Exchange of communications (COM) equipment, and for aircraft limited to VFR operation, also installation of COM equipment. This SC does not include installation of antennas.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft with a maximum cruising speed in ISA conditions below 250 kts, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B Chapter 2.

Additionally, the following applies:

— The equipment is authorised in accordance with JTSO-2C37d, JTSO-2C37e, ETSO-2C37e, JTSO-2C38d, JTSO-2C38e, ETSO-2C38e or ETSO-2C169a, or later amendments, or equivalent.

— The equipment is capable of 8.33 kHz and 25 kHz channel spacing.

— The minimum output power specified for the radio is sufficient for the operation depending on the maximum flight level of the aircraft. The table below is valid for standard antenna installations (antenna type and position) with standard cable length less than 4 m and 2 connectors:

Maximum aircraft Flight Level (FL)	Minimum output power
up to 100	4 Watts
100 to 150	6 Watts
150 to 200	8 Watts
200 to 250	10 Watts
250 to 300	12 Watts
300 to 400	16 Watts

For different installations (cable length, connectors), the required output power needs to be assessed by additional analysis:

— The equipment is qualified for the environmental conditions to be expected during normal operation.
— Instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

The equipment installation cannot be used to extend the operational capability of the specific aircraft (e.g. from VFR to IFR operation).

In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.

5. Manuals

Amend the AFM with AFMS containing or referencing the equipment instructions for operation, as required.

Amend the Instructions for Continuing Airworthiness to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC002c

INSTALLATION OF MODE S ELEMENTARY SURVEILLANCE EQUIPMENT

1. Purpose

This SC is for the installation of a Mode S transponder, including, optionally, an altitude encoder.

The individual installation of an altitude encoder is covered by this SC.

This SC does not include the installation of antennas (see CS-SC004, which may be applied concurrently).

Note: SC-CS005 refers to the installation of ADS-B OUT equipment.

2. Applicability/Eligibility

This SC is applicable to aeroplanes that are not complex motor-powered aircraft, and which have a maximum cruising speed in ISA conditions below 250 kt TAS, to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data:

— FAA Advisory Circular AC 43.13-1B, Chapter 11 and Chapter 12.

Additionally, the following conditions apply:

— The transponder equipment and its installation meet point CS ACNS.D.ELS.010 of CS-ACNS, and the altitude encoder meets ETSO-C88a, or later amendments, or its equivalent.

— The elementary surveillance system provides data according to CS ACNS.D.ELS.015.

— If automatic determination of the on-the-ground status is not available, the on-the-ground status is set to ‘airborne’.

— The reported pressure altitude is obtained from an approved source that is connected to the static pressure system that provides pressure to the instrument used to control the aircraft.

— Any antenna connected to the transponder has a resulting radiating pattern, which is vertically polarised, omnidirectional in the horizontal plane, and has sufficient vertical beam width to ensure proper system operation during normal aircraft manoeuvres.

— The equipment is qualified for the environmental conditions to be expected during normal operation.

— The installation instructions from the equipment manufacturer have to be followed.

— A system ground test that verifies all the transmitted data according to CS ACNS.D.ELS.015 has to be performed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

In the case of aircraft approved for NVISs/NVGs, if control/display panels are to be inserted, the change cannot be considered to be an SC.

If a Class A TABS device is already installed in the aircraft, the Mode S transponder system cannot be installed using CS-STAN.

5. Manuals

Amend the AFM with an AFMS that contains or references the equipment instructions for operation, as required.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required. In particular, include in the ICAs a check with content that is similar to the provisions of the latest revision of EASA SIB No.: 2011-15:

— at intervals defined and published by the competent authority, or

— at intervals defined in the latest revision of EASA SIB No.: 2011-15.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC003c

INSTALLATION OF AUDIO SELECTOR PANELS AND AMPLIFIERS

1. Purpose

This SC is for the installation of audio selector panels and amplifiers.

Audio selector amplifiers that feature automatic speech recognition are eligible for installation by means of this SC only if the automatic speech recognition feature is disabled.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 2; and

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally, the following conditions apply:

— the equipment is authorised in accordance with ETSO-C50c or ETSO-C139a, or later amendments, or the equivalent;

— the equipment has at least the audio functionality of the previously installed equipment, and is compatible with the existing installation;

— the equipment is compatible with the connections to the existing communication and navigation systems;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— the instructions and tests defined by the equipment manufacturer are followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

Any limitations of the existing installation remain valid.

In the case of aircraft approved for NVIS/NVG, if control/display panels are to be inserted, the change cannot be considered to be an SC.

5. Manuals

Amend the AFM with an AFMS that contains or references the equipment instructions for operation, as required.

If the audio selector includes connections to equipment with functions that are not part of the aircraft's control system or navigation system, and which may emit distracting sounds, add a limitation in the AFMS stating that these functions shall not be used during take-off and landing. Examples of such functions include telephony, personal messaging functions and music players.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC004a

INSTALLATION OF ANTENNAS

1. Purpose

This SC covers the installation and exchange of antennas other than RADAR and directional SAT/COM antennas. For aircraft certified to operate in known icing conditions, this SC only covers the exchange of antennas.

Installation of large antennas (such as High Frequency (HF) or Direction Finding (DF) antennas) in rotorcraft is not covered by this SC.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-2B, Chapter 1 & 3; and

— FAA Advisory Circular AC 43.13-1B, Chapter 11, Section 15 (on electrical bonding).

Additionally, the following applies:

— The antenna is installed in non-pressurised secondary structure areas, unless the location is set for this purpose in the airframe documentation or provided by the TC holder (i.e. NTO), or the antenna is being exchanged and has the same footprint.

— The antenna is located in a distance to other antennas appropriate for the aircraft and the antennas.

— The antenna is compatible with the connected equipment and is suitable for the environmental conditions to be expected during normal operation.

— For aircraft certified to operate in known icing conditions, the new antenna is located at the same position and has a size similar to that of the existing antenna being replaced.

— Instructions and tests defined by the equipment manufacturer have to be followed.

— The performance of the new antenna installation or of the new antenna type has to be confirmed during testing after installation (e.g. range of radio).

4. Limitations

Any limitations defined by the equipment manufacturer apply.

5. Manuals

Amend the Instructions for Continuing Airworthiness to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC005a

INSTALLATION OF AN ADS-B OUT SYSTEM COMBINED WITH A TRANSPONDER SYSTEM

1. Purpose

This SC is for the installation of ADS-B OUT systems. This SC allows the embodiment of different configurations for the voluntary transmission of ADS-B data (e.g. GPS position and velocity).

This SC addresses three cases:

— Configuration 1: an ADS-B OUT system that conforms to AMC 20-24[4];

— Configuration 2: an ADS-B OUT system with an ETSO-C199() GNSS position source;

— Configuration 3: an ADS-B OUT system with a GNSS position source that is not approved.

Note: The aircraft identified in the applicability/eligibility section of this SC do not need to comply with Commission Implementing Regulation (EU) No 1207/2011 or its later amendments. Consequently, they do not need to satisfy the requirements set by CS-ACNS Subpart D Section 4 '1090 MHz Extended Squitter ADS-B Out'.

The likelihood of erroneous data being transmitted to ADS-B ground stations and to other aircraft is defined by quality indicators.

— Configuration 1 installation provides quality indicators according to the principles that are defined in AMC 20-24 while controlling the latency through a direct connection between the transponder and the GNSS position source.

— Configuration 2 installation provides quality indicators that are defined in ETSO-C199.

— Configuration 3 sets the quality indicators to zero (0). Operators of aeroplanes fitted with a configuration 3 installation are expected to use the system for traffic awareness only. Equipment emitting with quality indicators that are set to 0 might not be seen by other aircraft systems or by ATC.

2. Applicability/Eligibility

This SC is applicable to aeroplanes that are not complex motor-powered aircraft, and that have a maximum cruising speed in ISA conditions below 250 kt TAS, to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data:

— FAA Advisory Circular AC 43.13-1B, Chapter 11 and Chapter 12.

For configuration 1:

The following conditions apply to configuration 1:

— The transponder equipment and its installation are compliant with CS-SC002c or later amendments, or are otherwise approved.

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[4] https://www.easa.europa.eu/sites/default/files/dfu/Annex%20II%20-%20AMC%2020-24.pdf

— The ADS-B transmit unit (transponder) is approved in accordance with ETSO-C166b, or later revisions, or the equivalent.

— The GNSS installation is approved and the GNSS receiver is approved in accordance with:

- ETSO-C129a, or
- ETSO-C196a or ETSO-C145c or ETSO-C146c,

or later amendments, or the equivalent.

— There is a direct digital interface between the GNSS receiver and the transponder, or the GNSS receiver is integrated into the transponder.

— The compatibility of the combination of the transponder and the GNSS receiver for conformity to AMC 20-24, including for latency, is explicitly stated by the manufacturer of the transponder.

— The quality indicators are configured according to the principles specified in AMC 20-24. SIL is typically a static (unchanging) value, and shall be set at the time of installation. SIL is based solely on the probability of the position source exceeding the reported integrity value, and it shall be set to SIL = 3 for configuration 1. The ADS-B SDA parameter indicates the probability of an ADS-B system malfunction causing false or misleading position information or position quality metrics to be transmitted. The SDA shall be set to report SDA = 2 for configuration 1.

— The correct transmission of the required parameters, identified in Section 7 of AMC 20-24, is verified during a ground test, which is performed in accordance with the instructions provided by the manufacturer of the transponder. The guidance of Appendix 1 to EASA SIB No.: 2011-15 (latest revision) should be considered. The ground test shall also check that all the parameters transmitted for the extended squitter are consistent with the data transmitted for elementary surveillance.

— The voluntary transmission of any additional parameters is verified to be correct through a ground test that is performed in accordance with the instructions provided by the manufacturer of the transponder.

— The installation instructions from the equipment manufacturer have to be followed.

For configuration 2:

The following conditions apply to configuration 2:

— The transponder equipment and its installation are compliant with CS-SC002c or later amendments, or are otherwise approved.

— The ADS-B transmit unit (transponder) is approved in accordance with ETSO-C166b, or later revisions, or the equivalent.

— The GNSS receiver is approved as a class B ETSO-C199 TABS device.

— The transponder is configured to use a class B ETSO-C199 GNSS position source. The GNSS receiver is configured as a class B ETSO-C199 TABS device (SIL=1), which is not compliant with any of the ETSOs defined in configuration 1 for the GNSS receiver.

— The compatibility of the combination of the transponder and the GNSS receiver is explicitly stated by the manufacturer of the transponder.

— The quality indicators are configured to report the quality indicators defined in ETSO-C199 (e.g. SDA=1 and SIL=1) in accordance with the instructions provided by the equipment manufacturer.

— The installation instructions from the equipment manufacturer have to be followed.

For configuration 3:

The following conditions apply to configuration 3:

— The transponder equipment and its installation are compliant with CS-SC002c or later amendments, or are otherwise approved.

— The ADS-B transmit unit (transponder) is approved in accordance with ETSO-C166b, or later revisions, or the equivalent.

— The GNSS receiver is not approved or its installation is not certified. However, the compatibility of the combination of the transponder and the GNSS receiver is explicitly stated by the manufacturer of the transponder.

— The quality indicators are configured according to the manufacturer instructions to report the lowest quality (e.g. SIL = 0 and SDA = 0, NACp = 0).

— The installation instructions from the equipment manufacturer have to be followed.

For all configurations:

The installation configuration shall be recorded within EASA Form 123.

Note: The values of the quality indicators are consistent with the equivalent combinations described in FAA AC 20-165B.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

An installation according to this SC cannot be used to claim compliance with CS-ACNS, Subpart D, Section 4 '1090 MHz Extended Squitter ADS-B Out installations'.

In the case of aircraft that are approved for NVISs/NVGs, if control/display panels are to be inserted, the change cannot be considered to be an SC.

5. Manuals

For configuration 1:

Amend the AFM with an AFMS to include a statement of compliance with AMC 20-24, as well as any necessary operating instructions, procedures or limitations.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required. In particular, include a check with content that is similar to the provisions of the latest revision of EASA SIB No.: 2011-15:

— at intervals defined and published by the competent authority, or

— at intervals defined in the latest revision of EASA SIB No.: 2011-15.

The ground test shall also include voluntarily transmitted ADS-B data (if any). This check satisfies the requirement for periodical maintenance that is referred to in AMC 20-24, Section 11.

For configuration 2:

Amend the AFM with an AFMS to include information on the quality indicators, as well as any necessary operating instructions, procedures or limitations.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required. In particular, include a check with content that is similar to the provisions of the latest revision of EASA SIB No.: 2011-15:

— at intervals that are defined and published by the competent authority, or

— at intervals that are defined in the latest revision of EASA SIB No.: 2011-15.

The ground test shall also include voluntarily transmitted ADS-B data (if any).

For configuration 3:

Amend the AFM with an AFMS to include information stating 'ADS-B OUT installation for airborne traffic awareness only' or similar information, together with any necessary operating instructions, procedures or limitations.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC031b

EXCHANGE OF CONVENTIONAL ANTI-COLLISION LIGHTS, POSITION LIGHTS AND LANDING & TAXI LIGHTS BY LED TYPE LIGHTS

1. Purpose

Exchange of anti-collision lights, position lights and landing & taxi lights by LED type lights.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and not approved for NVIS and any other ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-2B, Chapter 4; and

— FAA Advisory Circular AC 43.13-1B, Chapter 11, Section 15 (on bonding).

Additionally the following applies:

— anti-collision lights are authorised in accordance with ETSO-C96a or later amendments, or equivalent;

— position lights are authorised in accordance with ETSO-C30c or later amendments, or equivalent;

— the equipment is installed at the same location with identical light distribution angles and colours;

— the equipment is qualified for the environmental conditions to be expected during normal operation;

— instructions and tests defined by the equipment manufacturer have to be followed; and

— any modification of electrical wiring is performed in accordance with acceptable practices such as the aircraft maintenance manual or Chapter 11 of FAA Advisory Circulars AC 43.13-1B and Chapter 4 of AC 43.13-2B.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

5. Manuals

If needed, amend the AFM with AFMS containing equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required. In particular, consider description of required maintenance actions after failure of single LED segments.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC032a

INSTALLATION OF ANTI-COLLISION LIGHTS

1. Purpose

This SC covers the installation of anti-collision lights on wing tips, vertical tail tip and/or fuselage for aircraft not originally certified with anti-collision lights.
Exchange of anti-collision lights is covered by CS-SC031.

2. Applicability/Eligibility

Sailplanes including powered sailplanes and ELA2 aeroplanes , that have been certified as VFR and were not originally certified with anti-collision lights (this includes LSA, VLA and FAR 23 prior to Amendment 23-49 airplanes).

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-1B and AC 43.13-2B, Chapter 1 & 4;

— FAA Advisory Circular AC 43.13-1B Chapter 11; and

— FAA Advisory Circular AC 20-30B.

Additionally, the following applies:

— The equipment is authorised in accordance with ETSO-C96a or later amendments, or equivalent;

— The anti-collision light is located in a distance to other systems appropriate for the aircraft and the anti-collision light;

— The anti-collision light is compatible with the connected equipment and is suitable for the environmental conditions to be expected during normal operation;

— Impact on weight and balance needs to be considered;

— Instructions and tests defined by the equipment manufacturer have to be followed and recorded; and

— Any modification of electrical wiring is performed in accordance with acceptable practices such as the aircraft maintenance manual or Chapter 11 of FAA Advisory Circular AC 43.13-1B.

Depending on the installation position, the following paragraphs also apply:

3.1 Anti-collision lights installed on wing tips and/or vertical tail tip

— Anti-collision lights may be installed if their total weight, including reinforcements, is equal or lower than a certified anti-collision lights installation on a similar aircraft. Similarity shall be assessed following the guidelines given by AC 23.629-1B, Chapter 1, paragraph 1c. The location of the anti-collision lights shall be similar to the location on equivalent aircraft. This assessment shall be recorded within EASA Form 123.

— Anti-collision lights installation shall not alter torsional stiffness.

3.2 Anti-collision lights installed on fuselage

— The anti-collision light is installed in non-pressurised secondary structure areas, unless the location is set for this purpose in the airframe documentation or provided by the TC holder (i.e. NTO), or the anti-collision light is being installed on an existing provision with the same footprint.

4. Limitations

— Any limitation defined by the equipment manufacturer applies.

— No installation of anti-collision lights on control surfaces is permitted.

— Only installation on wings without sweep angle is allowed.

— Installation of anti-collision lights in wings with aspect ratio above 7 is not permitted

5. Manuals

Amend AFM with AFMS containing or referencing the equipment instructions for operation, as required.

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC033a

INSTALLATION OF CABIN AND COCKPIT CONVENTIONAL LIGHTS BY LED-TYPE LIGHTS

1. Purpose

Installation or exchange of cabin and cockpit conventional lights by LED-type lights. Installation of new warning, caution, or advisory lights is not covered by this Standard Change.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and not approved for NVIS, and any other ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally the following applies:

— any installation or exchange of lights shall not interfere or degrade the existing emergency lights system;

— in case of exchange of conventional lights by LED lights, the equipment should be installed at the same location and with identical light distribution angles and colours, or at least

- the new LED lights shall provide adequate lighting without introducing glare and/or reflections that could distract the flight crew or interfere with crew vision; and
- for lights exchanged in the cockpit:
  - if warning, caution, or advisory lights are exchanged they must be:
    - red, for warning lights (lights indicating a hazard which may require immediate corrective action);
    - amber, for caution lights (lights indicating the possible need for future corrective action); and
    - green, for safe-operation lights.
  - any other light exchanged in the cockpit must be of any other colour, including white, provided that the colour differs sufficiently from the colours used for warnings, cautions, and advisories to avoid possible confusion;

— in case of installation of LED lights:

- they shall provide adequate lighting without introducing glare and/or reflections that could distract the flight crew or interfere with crew vision; and
- if they are installed in the cockpit, they can be of any colour, provided the colour differs sufficiently from the colours used for warnings, cautions, and advisories to avoid possible confusion.

— the equipment is qualified for the environmental conditions to be expected during normal operation;

— instructions and tests defined by the equipment manufacturer have to be followed; and

— any modification of electrical wiring is performed in accordance with acceptable practices such as the AFM or FAA Advisory Circular AC 43.13-1B, Chapter 11.

4. Limitations

Any limitation defined by the equipment manufacturer applies.

5. Manuals

If needed, amend AFM with AFMS containing equipment instructions for operation, as required.

Amend ICA to establish maintenance actions/inspections and intervals, as required. In particular, consider description of required maintenance actions after failure of a single LED segment.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC034b

EXCHANGE OF AN EXISTING BATTERY FOR A LITHIUM IRON PHOSPHATE ($LiFePO_4$) BATTERY SYSTEM

1. Purpose

This SC is for the exchange of an existing battery for $LiFePO_4$ type battery systems in aircraft.

This SC does not cover or replace the applicable regulations for the handling, storage, transport, or disposal of batteries.

Note: This SC does not cover the installation of a battery in a new location.

2. Applicability/Eligibility

This SC is applicable to sailplanes, including powered sailplanes.

3. Acceptable methods, techniques, and practices

— Before installation, a statement has to be available to ensure that the battery systems, batteries or the battery cells are compliant at least with one of the following standards:

- RTCA DO-347, Certification Test Guidance for Small and Medium Sized Rechargeable Lithium Batteries and Battery Systems; or
- RTCA DO-311A, Minimum Operational Performance Standards for Rechargeable Lithium Batteries and Battery Systems; or
- UL 1642, Standard for Lithium Batteries, or the equivalent; or
- UL 2054, Standard for Household and Commercial Batteries, or the equivalent; or
- UL 62133 Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made From Them, for Use in Portable Applications, or the equivalent; or
- UL 1973 Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications, or the equivalent; or
- IEC 62133-2 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications, Part 2: Lithium systems, or the equivalent.

— For installation purposes, FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2, and FAA Advisory Circular AC 43.13-1B, Chapter 11, contain acceptable data.

— Any impact on the weight and balance of the aircraft needs to be considered.

4. Limitations

— Batteries that are used for propulsion are not covered.

— Starter batteries are not covered.

— The battery system shall have an integrated battery management system provided by the battery manufacturer.

— Each installed battery system shall have a maximum capacity of 160 Wh.

— Any limitation defined by the battery system manufacturer applies.

5. Manuals

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

A release to service by the pilot-owner is acceptable only if the original battery mounting and connectors remain.

Standard Change CS-SC035a

INSTALLATION OF SOLAR CELLS ON SAILPLANES

1. Purpose

This SC is for the installation of solar cells on sailplanes for the purpose of allowing longer operation of the on-board battery system.

This SC does not cover solar cells that are used to recharge any batteries or energy storage systems for an electric propulsion system on a powered sailplane.

This SC does not cover the installation of batteries.

2. Applicability/Eligibility

This SC is applicable to ELA1 sailplanes, including powered sailplanes.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data for installation purposes:

— FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2, and

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally, the following conditions apply:

— The solar cells shall be located either in the area of the upper side of the fuselage between the tangential bolts that connect the wings to the fuselage, and/or on the doors of a retractable engine, if applicable. Typically, the solar cells are bonded to the surface with self-adhesive tape as described/specified by the solar cell manufacturer.

— Any holes that are required to route cables from the solar cells into the inner parts of the fuselage should not be larger than 6 mm in diameter, and special attention is required to prevent any chafing or short-cuts in these feedthroughs. If several holes are required for these feedthroughs, then the number of holes should be minimised.

— Special care is required to avoid damaging any bulkheads or stringers on the inside of the fuselage structure when drilling these holes.

— Seal any hole in the skin and in the solar panel to prevent any moisture penetration beneath the solar panels.

— The distance between the new holes and the cut-outs or other edges should comply with the aircraft manufacturer’s guidance. In the absence of such guidance, a minimum of 100 mm should be considered.

— The electrical connection to the storage battery(ies) shall be installed according to the instructions of the solar cell charging system manufacturer, and shall:

- include a battery charge controller, to prevent overcharging of the storage battery(ies). If a lithium battery (or lithium batteries are) is installed, a battery management system is required;
- provide circuit protection (e.g. circuit breakers) against system overloads, and against smoke and fire hazards that result from intentional or unintentional system shorts, faults, etc.; and

- provide a clearly labelled 'on/off switch' for deactivating all the solar cells that is easily accessible by the pilot-in-command when in flight. As an alternative, a clearly labelled switch-rated circuit breaker may be used to also provide the circuit protection.

Note: The use of circuit breakers as switches is not acceptable as it can degrade their protection function, except for switch-rated circuit breakers, provided that they are shown to be appropriately rated for the number of switch cycles that are expected during the service life of the system or of the circuit breakers.

— After installation, perform a test to ensure that the flight control systems can move freely.

— Before the first operation in flight, a functional test of the system needs to be conducted on the ground with special attention paid to any possible overcharging or overheating of the system.

— Any impact on the weight and balance of the aircraft needs to be considered.

— Instructions and tests defined by the equipment manufacturer shall be followed.

4. Limitations

— If more than one battery will be charged, then all these batteries must have the same voltage and be of the same type and voltage (e.g. only lead-acid batteries running on 12 V).

— Any limitations defined by the solar cell and charging system manufacturer apply.

— Any limitations defined by the aircraft manufacturer apply (e.g. a limitation to install such solar cells onto a certain area on the surface of the sailplane).

— The installation of solar cells on structural parts such as the fuselage (i.e. not on the doors) is subject to the aircraft manufacturer not objecting to this installation.

— Solar cells must always be connected to the storage battery; direct power supply of flight instruments and ATC equipment is not allowed.

— The maximum power of the solar cells installed by means of this SC cannot exceed 40 W.

5. Manuals

Amend the AFM with an AFMS that contains or references the equipment instructions for operation, as required (e.g. Normal, Abnormal and Emergency Procedures for solar cell system power off).

Amend the ICAs to establish the required actions regarding the maintenance/cleaning/caring actions for the solar cells and charging system, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC036a

INSTALLATION OF VISUAL AWARENESS LIGHTS

1. Purpose

This SC is for the installation of visual awareness lights that are not certified as anti-collision lights and are not required by operational rules. These lights are typically high-intensity LEDs.

Due to their specialised purpose of helping pilots to avoid mid-air collisions, such light systems often have a limited field of coverage in the forward sector of the aircraft and/or they do not comply with the requirements as specified in the airworthiness requirements for aeroplanes (e.g. in CS-23).

Note*:* For the installation of anti-collision lights, refer to CS-SC032.

2. Applicability/Eligibility

This SC is applicable to ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data for installation purposes:

— FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2 are acceptable, and

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally, the following conditions apply:

— Any impact on the weight and balance of the aircraft needs to be considered.

— For sailplanes, the visual awareness light systems shall be installed in one or more of the following locations:

- in the area of the upper/lower side of the fuselage between the tangential bolts that connect the wings to the fuselage;
- on the doors of a retractable engine;
- on the doors of the landing gear;
- on the nose of the aircraft;
- on the outer side of the wing tips;
- on the empennage;
- on top of the instrument panel;
- in the inside of the forward part of the canopy.

— For other aircraft, consider the conventional airframe locations for these lights.

— Typical installations are streamlined shapes that are mounted on the upper/lower side of the fuselage, the aircraft nose or wing tips, and devices that are installed on the inside of the canopy facing forward with provisions to not blind the pilot with the emitted light.

— For aircraft that only have storage batteries, the visual awareness light systems must be suitable for the voltage, power and type of these batteries.

— For aircraft with conventional power systems, an electrical load analysis has to be considered.

— Any holes that are required to mount the visual awareness light and the related route cables into the inner parts of the fuselage must not be larger than 6 mm in diameter. Special attention is required to prevent any chafing or short-cuts in these feedthroughs.

— If several holes are required for these feedthroughs, then these shall not be closer than 30 mm from each other, and the number of holes must be minimised.

— Special care is required to avoid damaging any bulkheads or stringers on the inside of the fuselage structure when drilling these holes.

— Follow the instructions of the visual awareness light manufacturer. Special care is required to prevent any possibility that the operating visual awareness light might blind the pilot or that the visual awareness light might hinder the forward vision of the pilot or any other aircrew on board, including reflections from the canopy/front windshield.

The design of the equipment installation must take into account crashworthiness, the arrangement and visibility of the installation, and any interference with other equipment.

Additionally, if the system is mounted in the inner side of the canopy or on the instrument panel, the design of the equipment installation must take into account the canopy jettison and the emergency exit.

— The electrical connection to the storage battery(ies) shall be installed according to the instructions of the visual awareness light system manufacturer, and shall:

  - provide circuit protection (e.g. circuit breakers) against system overloads, smoke and fire hazards that result from intentional or unintentional system shorts, faults, etc.; and
  - provide a clearly labelled ‘on/off switch’ for deactivating all visual awareness lights that is easily accessible by the pilot-in-command in flight. As an alternative, a clearly labelled switch-rated circuit breaker may be used to also provide circuit protection.

  Note: The use of circuit breakers as switches is not acceptable as it can degrade their protection function, except for a switch-rated circuit breaker, provided that it is shown to be appropriately rated for the number of switch cycles that are expected during the service life of the system or of the circuit breaker.

— Before the first operation in flight, a functional test of the system has to be conducted on the ground with special attention to the possible blinding of the pilot or the overheating of the system.

— Instructions and tests defined by the equipment manufacturer shall be followed.

— For aircraft that are not limited to day VFR conditions, a placard shall be installed to limit the use of visual awareness lights to day VFR conditions only.

4. Limitations

— Visual awareness lights should be operated in day VFR conditions only and for situational awareness only.

— Any limitations defined by the visual awareness light system manufacturer apply.

— Any limitations defined by the aircraft manufacturer apply (e.g. a limitation to only install such visual awareness light on a certain area on the surface of the aircraft).

— This SC does not cover visual awareness light systems that require any modifications to parts of the wings (except wing tips) or to the empennage of the aircraft.

— The maximum number of visual awareness lights installed on each wing and the empennage is one on each.

5. Manuals

The AFMS shall, at least, contain:

— a description of the system, its operating modes and functionality;

— limitations, warnings and placards, as required; and

— the normal and emergency operating procedures.

Amend the ICAs to establish the required actions regarding the maintenance/cleaning/caring actions for the visual awareness light system, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC037a

EXCHANGE OF A MAIN AIRCRAFT BATTERY

1. Purpose

This SC is for the exchange of a main aircraft battery (e.g. starter battery, batteries for sailplanes) for another type that meets the same minimum standards.

This SC does not cover the installation of lithium batteries.

This SC does not cover the installation of a battery in a new location.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data for installation purposes:

— FAA Advisory Circular AC 43-13-2B, Chapters 1, 2 and 10.

Additionally, the following conditions apply:

— An acceptable standard for the battery or the test of the battery cells (performed and stated by the battery manufacturer) is:

- ETSO-C173A or later amendments, or the equivalent.

— Any impact on the weight and balance of the aircraft shall be considered.

— The new battery shall:

- feature a maximum power that is greater than or equal to the power of the replaced battery; and
- have a capacity that is greater than or equal to the capacity of the replaced battery.

4. Limitations

— Any limitations defined by the battery manufacturer apply.

— The regulations for the handling, storage, transport, and disposal of batteries apply.

— Batteries that are used for propulsion are not covered.

— Backup batteries that support essential systems such as avionics, or that are used for IFR, are not covered by this SC.

5. Manuals

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC038a

INSTALLATION OF DC TO DC CONVERTERS

1. Purpose

This SC is for installations of DC to DC converters to support avionics installations, equipment that require a power supply with a controlled voltage, and pilot devices.

This SC cannot be used where the converter is intended to power the following:

— aircraft systems that are necessary for continued safe flight and landing, or

— aircraft systems that are required to comply with airspace regulations.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2, and

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally, the following conditions apply:

— The DC to DC converters are authorised in accordance with ETSO-C71 or later amendments, or the equivalent.

— The installation of the DC to DC converters shall be protected by circuit protection (e.g. circuit breakers) against system overloads, smoke and fire hazards that result from intentional or unintentional systems shorts, faults, etc. The design of the equipment installation must take into account crashworthiness, the arrangement of the installation and any interference with other equipment.

— The design of the equipment installation must take into account the structural integrity of the instrument panel or any other attachment point. Special consideration is necessary for equipment that is installed in a location behind the occupant(s).

— The equipment is suitable for the environmental conditions to be expected during normal operation.

— The installation instructions and tests defined by the equipment manufacturer have to be followed.

— If multiple busbars are available, the DC to DC converter should be connected to the busbar that supports the criticality that is appropriate to the equipment that the converter supplies.

— If there are systems or equipment that are supplied by an essential power supply, i.e. systems or equipment that are necessary for continued safe flight and landing, an electrical load analysis or electrical measurements shall be undertaken. This analysis or measurement shall take into account the maximum loading that may be utilised from the PSS for the PED to substantiate that the aeroplane’s electrical power generating system has sufficient capacity to safely provide the maximum amount of power required by the PSS for the PED. This assessment shall be recorded in EASA Form 123.

— Perform an EMI test to assess any interference from the converter with other systems.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

5. Manuals

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

Amend the AFM with instructions for operation, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC051c

INSTALLATION OF 'FLARM' EQUIPMENT

Note: Originally FLARM® equipment was developed for sailplanes, but nowadays, such devices are more and more installed in other light aircraft as well. While FLARM® devices are considered to be Standard Parts in the case of sailplanes, 21.A.307(c) may allow their installation without Form 1.

1. Purpose

This SC is for the installation or exchange of FLARM® traffic awareness and collision avoidance systems. These systems are based on the specifications as defined by FLARM Technology Ltd.

Note: FLARM equipment is not equivalent to Transponder Mode A/C/S, ADS-B, Class A TABS or TCAS/ACAS equipment.

An aircraft that has only FLARM equipment installed will not be seen by air traffic control or by ACAS/TCAS systems.

The installation of additional batteries is not covered by this SC.

This SC does not cover the installation of external antennas (see CS-SC004, which may be applied concurrently).

2. Applicability/Eligibility

This SC is applicable to ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2, and

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally, the following conditions apply:

— The design of the equipment installation must take into account crashworthiness, the arrangement of the installation and its visibility, interference with other equipment, the canopy jettison and the emergency exit.

— The design of the equipment installation must take into account the structural integrity of the instrument panel or any other attachment point. Special consideration is necessary for equipment that is installed in a location behind the occupant(s).

— Data bus/data connectivity between the FLARM device and other equipment which is:

- ETSO-authorised (or the equivalent); or
- required by the TCDS, AFM or POH; or
- required by other applicable requirements such as those for operations and airspace,

is not allowed unless the FLARM device is explicitly listed by its manufacturer as compatible equipment to which the other equipment can be connected.

— The equipment is suitable for the environmental conditions to be expected during normal operation.

— Instructions and tests defined by the equipment manufacturer have to be followed.

— Fly the aircraft to assess the installation for satisfactory antenna coverage and identify any possible limitations, by analysing data from the built-in flight recorder with the 'FLARM Range Analyzer' tool of FLARM Technology Ltd (available at www.flarm.com).

Note: The above-mentioned flight is considered to be part of the SC installation activity, and it can be conducted without an individual Permit to Fly or any other certificate of release to service for the SC installation, as long as there is no other maintenance activity ongoing on the aircraft (i.e. other maintenance, which has not yet been released to service). The flight should be conducted by a pilot who understands the aircraft configuration (i.e. for an FLARM installation that has not yet been released to service). EASA Form 123 and the certificate of release to service for the installation of the SC should be issued after the result provided by the FLARM range analyzer tool has been assessed and found to be satisfactory.

4. Limitations

— The FLARM® based system cannot be used to substitute for any anti-collision device that is mandated by the EU OPS rules for the intended operation.

— In the case of aircraft that are approved for NVIS/NVG, if control/display panels are to be inserted, the change cannot be considered to be an SC.

— Any limitations defined by the manufacturer of the FLARM® device are applicable. These must include periodical firmware and such database updates that are necessary for the intended function of the device.

5. Manuals

The AFMS shall, at least, contain:

— a description of the system, its operating modes and its functionality;

— limitations, warnings and placards, at least, for the following:

- 'For situational awareness only',
- 'Use in day VFR only';

— the normal and emergency operating procedures; and

— instructions for carrying out software and database updates.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC052c

INSTALLATION OF GNSS EQUIPMENT

1. Purpose

This SC is for the installation of GNSS equipment to enhance situational awareness. This could also include moving map GNSS-based functions.

This SC does not include the installation of external antennas (see CS-SC004, which may be applied concurrently).

For integrated systems that also provide voice communications functionality and/or VOR navigation capability, CS-SC052 may be applied concurrently with CS-SC001 and/or CS-SC056.

This SC does also not cover the connection of the GNSS equipment to any kind of AFCS, nor to an ADS-B OUT system.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 20-138D, including Change 1 and Change 2, Appendix 6, with the exception of paragraphs A6-4.c and A6-4.f.,

— FAA Advisory Circular AC 43-13-2B, Chapter 1 and 2, and

— FAA Advisory Circular AC 43.13-1B, Chapters 11 and 12.

Additionally, the following conditions apply:

— The design of the equipment installation must take into account crashworthiness, the arrangement and visibility of the installation, and it should not interfere with any other equipment, the canopy jettison (if applicable), or the emergency exit.

— Data connectivity with the installed equipment and other equipment which is:

- required by the TCDS, AFM or POH,
- required by other applicable requirements such as those for operations and airspace, or
- mandated by the respective MEL, if this exists,

is not allowed unless the equipment that is being installed is explicitly listed by its manufacturer as compatible equipment to which the other equipment can be connected.

— The equipment is suitable for the environmental conditions to be expected during normal operation.

— The instrument does not introduce any glare or reflections that could interfere with the pilot's vision. This condition applies to the instrument for all operations for which certification is requested.

— The equipment must be installed and tested in accordance with the equipment manufacturer's instructions.

4. Limitations

— The system is to be used for situational awareness under VFR only.

— The equipment installation cannot be used to extend the operational capability of the specific aircraft (e.g. from VFR to IFR).

— All relevant integrated databases (e.g. for charts) must be current.

— In the case of aircraft that are approved for NVIS/NVG, if control/display panels are to be inserted, the change cannot be considered to be an SC.

— Any limitations defined by the equipment manufacturer apply.

5. Manuals

The AFMS shall, at least, contain:

— a description of the system, its operating modes and its functionality;

— a limitations section that states the following:

‘This equipment is to be used for situational awareness only’, and

— the normal and emergency operating procedures.

Amend the maintenance manual with instructions for carrying out software and database updates.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC053b
INSTALLATION OF RADIO MARKER RECEIVING EQUIPMENT

1. Purpose

Installation or exchange of Radio Marker Receiving equipment.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 2.

Additionally, the following applies:

— the equipment is authorised in accordance with ETSO-2C35d, or later amendment, or equivalent;

— the equipment is compatible with the existing installation;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

The equipment installation cannot be used to extend the operational capability of the specific aircraft.

In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.

5. Manuals

Amend AFM with AFMS containing or referencing the relevant equipment instructions for operation, as required.

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC054b

EXCHANGE OF DISTANCE-MEASURING EQUIPMENT (DME)

1. Purpose

Exchange of DME operating within the radio frequency range of 960–1215 MHz. This SC does not include installation of antennas.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 2.

Additionally, the following applies:

— the equipment is authorised in accordance with ETSO-2C66b, or later amendment, or equivalent;

— the equipment has the same functionality, is installed at the same location, and is compatible with the existing installation;

— the equipment is compatible with connections to existing flight management/navigation systems;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.
The equipment installation cannot be used to extend the operational capability of the specific aircraft.
In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.

5. Manuals

Amend AFM with AFMS containing or referencing the relevant equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC055b
EXCHANGE OF ADF EQUIPMENT

1. Purpose

Exchange of ADF equipment. This SC does not include installation of antennas.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft with the ADF equipment not connected to AFCS with upper modes and integrated FMS navigation system, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:
— FAA Advisory Circular AC 43-13-2B, Chapter 2.

Additionally, the following applies:
— the equipment is authorised in accordance with ETSO-2C41d, or later amendment, or equivalent;

— the equipment has the same functionality, is installed at the same location, and is compatible with the existing installation (i.e. approval grandfathered under Regulation (EU) No 748/2012), as well as with connections to existing flight management/navigation systems;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.
The equipment installation cannot be used to extend the operational capability of the specific aircraft.
In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.
In the case of rotorcraft, no SW or AEH should be loaded nor analogic instruments be exchanged with digital instruments or MFD.

5. Manuals

Amend AFM with AFMS containing or referencing the equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC056b
EXCHANGE OF VOR EQUIPMENT

1. Purpose

Exchange of VOR equipment including Localizer/Glideslope indicator and converter. This SC does not include installation of antennas.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft with the VOR equipment not connected to AFCS with upper modes and integrated FMS navigation system, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:
— FAA Advisory Circular AC 43-13-2B, Chapter 2.

Additionally, the following applies:
— the equipment is authorised in accordance with ETSO-2C40c, or later amendment, or equivalent;

— the equipment has the same functionality, is installed at the same location, and is compatible with the existing installation;

— the equipment is compatible with connections to existing flight management/navigation systems;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.
The equipment installation cannot be used to extend the operational capability of the specific aircraft.
In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.
In the case of rotorcraft, no SW or AEH should be loaded nor analogic instruments be exchanged with digital instruments or MFD.

5. Manuals

Amend AFM with AFMS containing or referencing the equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC058a

INSTALLATION OF TRAFFIC AWARENESS BEACON SYSTEM (TABS) EQUIPMENT

1. Purpose

Installation of TRAFFIC AWARENESS BEACON SYSTEM (TABS).

TABS equipment are intended for voluntary equipage on aircraft not required to carry a transponder or automatic dependent surveillance - broadcast (ADS-B) equipment. This SC does not qualify the TABS equipment installation to meet the transponder or ADS-B requirements defined in European Commission Implementing Regulations (EU) No 1206/2011 and (EU) No 1207/2011, therefore, this TABS installation is not sufficient to fly into transponder mandatory zones (TMZ). Additional requirements may apply, ref to CS-SC002b or later amendment.

The installation of a TABS will enable an aircraft to be visible to air navigation service providers and other aircraft equipped with:

— traffic advisory system (TAS); or

— traffic alert and collision avoidance system I (TCAS I); or

— traffic alert and collision avoidance system II (TCAS II); or

— ADS-B IN capability.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapters 1 and 2.

Additionally, the following applies:

— The equipment is authorised according to ETSO-C199[5];

— The design of the equipment installation must take into account crashworthiness, arrangement and visibility, interferences with other equipment, the canopy jettison and the emergency exit;

— The design of the equipment installation must take into account the structural integrity of the instrument panel or any other attachment point. Special consideration is necessary for equipment installed at a location behind the occupant(s);

— data connectivity with the TABS equipment and other equipment which is:

- required by TCDS, AFM or POH; or
- required by other applicable requirements such as those for operations and airspace; or

[5] ETSO-C199 will be published as part of CS-ETSO Issue 13.

- mandated by the respective minimum equipment list (MEL), if this exists,

is not allowed unless the TABS is explicitly listed by its manufacturer as compatible equipment to be connected to;

— The equipment is suitable for the environmental conditions to be expected during normal operation;

— Instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

— Any limitation defined by the manufacturer of the TABS equipment.

— ADS-B IN information, if provided, is for situational awareness only.

— In case a Mode A/C/S Transponder system is already installed in the aircraft, the TABS equipment cannot be installed using CS-STAN.

5. Manuals

The AFMS shall, at least, contain:

— the system description, operating modes and functionality;

— the normal and emergency operating procedures;

— If the TABS provides ADS-B IN information, the AFMS must include a statement that the ADS-B IN data is to be used for situational awareness only.

Amend ICA to establish maintenance actions/inspections and intervals, as required, including instructions in case of software and database updates.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC081a

EXCHANGE OF TYRES (INNER TUBES/OUTER TYRES)

1. Purpose

This SC is intended to allow exchange of tyres (i.e. the change of inner tubes and/or outer tyres) with a different tube/tyre of the same size and strength.

2. Applicability/Eligibility

Sailplanes including powered sailplanes.

3. Acceptable methods, techniques, and practices

Information by the aircraft manufacturer or STC holder needs to be observed to avoid damages to the wheel/brake system/landing gear installation.

Typically the change may only be performed by un-installing the relevant wheel and/or disassembly of the brake system.

Often the aircraft needs to be placed on jacks or the fuselage needs to be turned upside down (in case of disassembled sailplanes) to allow such a disassembly. Information of the manufacturer or STC holder needs to be observed for the jacking or turning upside down.

As tyres increase in size with time, and a new tube may move in such a worn-out tyre, and an old tube may chafe in a new tyre more easily, it is recommended to always replace both the tyre and the tube at the same time.

Tyres shall only be replaced by tyres having the same size, static load rating and ply rating.

Ensure that a replacement tube is of the correct size for the tyre.

After installation:

— bring the tyre/tube to the pressure according to the aircraft manufacturer or STC holder data (ensuring that the rated pressure of the replacement tyre/tube is not exceeded)

— check proper function of the brake system and landing gear retraction system when applicable

— check that the tyre has the required minimum space for turning freely.

It is recommended to indelibly mark the alignment between tyre and wheel to allow for a later check of any relative movement.

4. Limitations

N/a

5. Manuals

N/a

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC082a

EXCHANGE OF SKIDS ON WING TIPS/FUSELAGE TAILS

1. Purpose

This SC is intended to allow exchange of skids, typically made of rubber or other elastic material, installed on fuselage tails and/or wing tips. This may be required to exchange a different skid of comparable size and strength or exchange of a rubber skid by a rubber skid with a small wheel.

2. Applicability/Eligibility

Sailplanes including powered sailplanes.

3. Acceptable methods, techniques, and practices

Before exchange the old skid and any left-overs of the old bonded skid/glue needs to be removed.

Information by the aircraft manufacturer or STC holder needs to be observed to avoid damages to the skid or installation area.

Typically the installation is by gluing the rubber skid to the surface of the underside of the wing or fuselage tail.

The glue to be used may be of an industrial glue type (e.g. 'Pattex®') or an acrylic mounting glue (e.g. 'Sikaflex®').

Before performing the new glue bonding, clean all surfaces and prepare to press the new skid to the bonding joint during drying/polymerisation of the glue.

After bonding, it is recommended to seal the glue joint by means of a tape to prevent dirt or grass to enter into the glue joint.

If the aircraft manufacturer or STC holder requires a wire deflector to prevent capture of a winch wire at the glue joint of a tail skid then such a deflector needs to be installed – otherwise such a deflector (which could be a strong steel wire at the leading edge of the tail skid) is recommended.

When changing towards a rubber skid with small wheel, it is recommended to test the strength of the wheel by dropping the tail/wing tip from a height with the new installed skid which simulates the dropping of the tail or wing tip during a landing.

Use of this SC for installation of a skid which is installed by means of screws or bolts is permitted only for replacement by the same type of skid.

After installation, verify that the movement of the flight controls is not impaired by the new skids. The exchange is not allowed if the new skids do not have the proper size (i.e. the required movement of the control surfaces is more limited than with the old skids).

Additionally, a weight and balance report should be completed to show that the aircraft with the new skid is within the weight and balance limits defined by the aircraft manufacturer for the empty aircraft.

4. Limitations

N/a

5. Manuals

N/a

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC083a

EXCHANGE OF FLEXIBLE SEALS ON CONTROL SURFACES

1. Purpose

This SC is intended to allow exchange of flexible seals as installed on control surfaces on wings and empennages and/or to change the joint means of the seal (e.g. use of screws/bolts instead of glue-type joint).

2. Applicability/Eligibility

ELA1 aircraft.

3. Acceptable methods, techniques, and practices

Typically the installation is by bonding tapes to the surfaces of the control surface and/or wing or tail surface.

Before exchange the old seal and any left-overs of the old bonded seal/glue needs to be removed.

Any applicable instructions provided by the aircraft manufacturer or STC holder must be applied to avoid damages to the installation area.

In addition to the use of self-adhesive tapes, glue of an industrial glue type for flexible seals needs to be used.

Before performing the new glue bonding, clean all surfaces and prepare to press the new seal to the surface during drying/application.

Check for full displacement of any control surface after installation of the new seals – it is good practice to do this on a disassembled aircraft as the disassembled wing/tail area may have more rudder deflection range than after installation on the aircraft.

When changing towards a Mylar-type of seal (or a metal seal), it is recommended to test that the Mylar tape (or the metal strip) is in contact to the control surface over the full range of control surface movement to prevent reduction of performance or later noise during deflections.

The exchange is not allowed if the seals do not have the proper size (i.e. are not long enough so that parts of the control surface have no seal installed, or expose a gap in the sealing towards full control surface deflection.

Additionally, verify that the movement of the flight controls is not impaired by the new seals.

After installation of the replacement seals, a check during the next flight against noises or influence upon controllability shall be performed and a qualitatively satisfactory result is recorded in the Form 123.

After installation of the replacement seals, fly the aircraft to qualitatively assess effects on noises and influence upon controllability.

Note: The above mentioned flight is considered part of this SC and can be conducted without a certificate of release to service for the SC, as long as there is no other maintenance activity ongoing on the aircraft (i.e. other maintenance which has not yet been released to service). The flight should be conducted by a pilot understanding the aircraft configuration (i.e. exchange of flexible seals not yet released to service). EASA Form 123 and the certificate of release to service for the installation of the SC should be issued after assessing satisfactorily the result.

4. Limitations

N/a

5. Manuals

N/a

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC084a

REPAINTING OF COMPOSITE AIRCRAFT STRUCTURES

1. Purpose

This SC is for the repainting of the outer surfaces of composite aircraft with alternative varnishes of the acrylic or polyurethane paint types.

2. Applicability/Eligibility

This SC applies to ELA2 aircraft that have composite structures.

3. Acceptable methods, techniques, and practices

— Remove the old gelcoat or paint (e.g. by sanding down) and ensure that the resulting surface is adequate for the repainting (i.e. free of cracks, pinholes or voids, free of any grease or silicone or dust).

Note: Particular attention should be paid during the removal of the old gelcoat or paint to prevent any damage being caused by high temperatures.

— Inspect the structure in order to ensure that:

- the structure has not been damaged during the removal of paint; and
- all the repairs that are found have been made against the applicable repair instructions.

— The paint manufacturer's instructions and safety information shall be observed.

— After each renewal of the coat of paint, a weight and balance check of the aircraft must be completed; in particular, it shall be assured that the weight and the residual moments of the control surfaces are within acceptable limits.

— Respect/replicate any mandatory placards or markings.

4. Limitations

— Any limitations defined by the paint manufacturer apply.

— Any limitations defined by the aircraft manufacturer apply (e.g. a limitation to a white surface colour and/or limits to the mass balancing [the weight and moment] of any control surface). In the absence of any manufacturer's indications regarding the acceptable colours, only the original colour or the white colour should be considered.

5. Manuals

Amend the ICAs to establish the required actions regarding the maintenance/cleaning/caring actions for the new outer surface, as required, referring to the paint manufacturers' maintenance and repair instructions.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC085a

EXCHANGE OF AN AIRCRAFT LIVERY PAINT AND DECORATIVE STICKER SCHEME

Purpose

This SC is for a full or partial exchange of the design of the external livery of an aircraft.

1. Applicability/Eligibility

This SC applies to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

2. Acceptable methods, techniques, and practices

(a) Paint/sticker materials to be used: by default, only materials (e.g. primer, filler, top coat, gelcoat, decorative adhesive sticker, etc.) that have been approved to be used on a given aircraft through the existing applicable maintenance data (e.g. the AMM, supplemental maintenance manual, or any other ICAs that are applicable to the aircraft) shall be used.

If some or all of the materials listed in the existing ICAs are either no longer available (obsolete) or not compliant with the applicable environmental protection requirements, then the following two options apply:

— the use of alternate materials shall be approved in accordance with Part 21, or

— materials may be used if they have been declared by the materials' manufacturer(s) to be equivalent to the materials listed in the existing ICAs.

(b) Application processes for paint/sticker materials: any application processes/techniques that were approved by the TC/STC holder through the applicable maintenance data (e.g. the AMM, the SMM, or the equivalent ICAs) shall be followed.

Otherwise, the application processes/techniques that were documented and published by the manufacturer of the materials shall be followed.

In any case, the aircraft pre-painting preparation tasks and the final checks (bounding, balance, etc.), if any, that were defined by the TC/STC holder shall be followed.

Note: Particular attention must be paid to not cover static ports, fuel vents, drainage and similar openings.

(c) Design of the external livery: when defining the design of the external livery, the following must be considered:

(1) Markings: each emergency exit and external door (if any) in the passenger compartment must be externally marked and readily identifiable from outside the aeroplane by:

— a conspicuous visual identification scheme; and

— a permanent decal or placard on or adjacent to the emergency exit that shows the means of opening the emergency exit, including any special instructions, if applicable. Each placard and operating control for each emergency exit must be red in colour.

(2) Fuel filler openings must be marked at or near the filler cover with:

— for reciprocating engine-powered aircraft:

- the word that identifies the correct type of fuel, e.g. ‘Avgas’, ‘MOGAS’, ‘Diesel’, ‘Jet Fuel’, as applicable; and
- the minimum fuel grade;

— for turbine engine-powered aircraft:

- the word that identifies the correct type of fuel, e.g. ‘Jet Fuel’, as applicable; and
- the permissible fuel designations, or references to the AFM for permissible fuel designations;

— for pressure fuelling systems, the maximum permissible fuelling supply pressure and the maximum permissible defuelling pressure.

(3) Oil filler openings must be marked at or near the filler cover with:

— the word ‘Oil’; and

— the permissible oil designation, or references to the AFM for permissible oil designations.

(4) Coolant filler openings must be marked at or near the filler cover with the word ‘Coolant’.

(5) The system voltage of each direct current installation (if any) must be clearly marked adjacent to its external power connection.

(6) Every external marking/placard (including the aircraft registration marks) must have a colour contrast that is readily distinguishable from the surrounding surface.

(7) After the painting or application of decorative stickers, every placard that was originally installed as per the aircraft ICAs or AFM shall be reinstalled and verified for proper readability.

(d) Slip-resistant surfaces

(1) If any areas of the aircraft are already covered with slip-resistant material (e.g. the upper surface of the wing root), those areas must either remain untouched or identical areas of the slip-resistant material approved by the TC or STC holder can be reinstalled following the embodiment of the new paint scheme.

(2) Using this SC, the areas that are covered with slip-resistant material shall not be enlarged, and no such areas shall be added to an existing design. Any enlargement of, or addition to, the areas covered with slip-resistant material shall be approved in accordance with Part 21.

(e) Weight and balance

(1) Emphasis is directed to the effect of too many extra coats of paint on the general weight and balance of an aircraft, and more particularly regarding balanced control surfaces. Adding additional coats of paint in excess of what the TC or STC holder originally applied in accordance with existing applicable maintenance data must be avoided. Where available, the TC or STC holder’s instructions relative to the finishing and balance of control surfaces must be consulted and followed.

(2) If the design change involves the painting of the complete aircraft (or extensive use of decorative stickers), then after the completion of the painting, the aircraft must be weighed in accordance with the TC holder’s applicable maintenance data. The aircraft weight and balance report shall be updated accordingly.

3. Limitations

Any limitations defined by the TC or STC holder apply.

If materials have been used that are not listed in the existing ICAs, any limitations defined by the manufacturers of the materials apply.

4. Manuals

Amend the ICAs to include a clear and complete description of the external livery paint scheme. It is recommended that this description should take the form of a drawing that includes:

— the overall design, including the dimensions and details of any painted markings;

— the paint/decorative sticker reference(s) and colour(s); and

— the type, serial number and registration of the aircraft to which the drawing belongs.

Notes:

- If materials have been used that are not listed in the existing ICAs, proof from the manufacturer of the materials that the materials used are considered to be equivalent to the materials listed in the existing ICAs must be recorded as part of the aircraft records.
- If application processes/techniques have been used that are not documented in the applicable maintenance data (the AMM, the SMM, or the equivalent ICAs), the documented application processes/techniques of the manufacturer of the materials must be recorded as part of the aircraft records.

5. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC086a

EXCHANGE OF A BALLOON 'BOTTOM-END'

1. Purpose

This SC is for the replacement of a complete bottom-end with a different one that is part of the type certificate of another approved balloon.

A complete bottom-end comprises the basket, the burner frame, the burner, the fuel cylinders and the fuel hoses of a single manufacturer.

Note: In a balloon, the envelope identifies the aircraft registration, the type certificate and the serial number. Changing the bottom-end is considered to be a modification to the aircraft type design, i.e. it results in a modified balloon. The certificate of airworthiness, the aircraft flight manual, the aircraft logbook, etc., belong to the modified balloon (i.e. they 'remain' with the envelope).

2. Applicability/Eligibility

This SC is applicable to hot-air balloons, as defined in ELA1, which are used in non-commercial operations.

3. Acceptable methods, techniques, and practices

The following considerations apply:

— The maximum take-off mass of the modified configuration shall not be greater than the original one. Consider limiting factors like bottom end payload and burner performance.

— The minimum landing mass of the modified balloon must be greater than or equal to the approved minimum landing mass of the original balloon. If the minimum landing mass is not defined, a good estimate is $\frac{150\ kg}{1\,000\ m^3}$.

— The performance of the burner must be adequate for the size of the envelope. Guidance on the adequacy of the performance of the burner can be derived from the TCDS.

— If the dimensions of the basket (width to length) exceed the proportions of 1 to 1.3, the envelope must be equipped with turning vents.

— The number of attachment points for the basket wires in the original configuration must be the same as in the new configuration after the exchange.

— The means of attachment of the flying wires must be the same as in the original configuration (e.g. replace carabiners with carabiners, shackles with shackles).

— The burner frame geometry regarding the position of the attachment points must be congruent (same dimension in x and y direction, in the same plane).

— If a bottom-end from manufacturer A is combined with an envelope from manufacturer B, then:

- check that the geometry of the attachment points of the bottom-end from manufacturer A is identical to the geometry of the attachment points of the burner frame from manufacturer B, as referenced in the flight manual of manufacturer B for the selected envelope;
- a tolerance of maximum 25 mm between the two attachment points is acceptable.

— The owner is responsible for the continued airworthiness of the changed configuration.

— The aircraft maintenance programme must be amended according to the new configuration.

— The equipment list must be amended in accordance with AMC M.A.801 to record all parts of the new configuration.

4. Limitations

— All parts must be included in an EASA-approved type design.

— All parts must be accompanied by an EASA Form 1, or an equivalent airworthiness certificate, or be listed in the equipment list associated with a valid airworthiness review certificate.

— Any limitations defined by the manufacturers of the bottom-end and the envelope apply.

— Modifications to the flying wires, e.g. lengthening or shortening of the wires and their attachments, is prohibited, unless defined in the ICA by the TC holder.

5. Manuals

The flight manual of the modified configuration must be supplemented by manufacturer-specific information of the bottom-end and should contain, at least, the following:

— a description of the system, its operating modes and its functionality;

— the limitations and warnings;

— the emergency and normal operating procedures; and

— the ICAs.

6. Release to service

This SC may be released by the pilot-owner subject to compliance with AMC M.A.801.

Standard Change CS-SC101b

INSTALLATION OF EMERGENCY LOCATOR TRANSMITTER (ELT) EQUIPMENT

1. Purpose

Installation or exchange ELT equipment. This SC does not include installation of antennas.

2. Applicability/Eligibility

Aeroplanes with MTOM below 2 730 kg, rotorcraft not being complex motor-powered aircraft with MTOM below 1 200 kg and four or less occupants, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 1 and 2.

Additionally, the following applies:

— Instructions from equipment manufacturer have to be followed.

— A position for the installation needs to be chosen avoiding shielding by carbon layers.

— It must be ensured that the equipment is installed in a way that, in case of a crash, it is unlikely that the antenna would be detached from the transmitter.

— The equipment is authorised in accordance with ETSO-C126a or later amendments, or equivalent.

— The ELT is considered a passive device whose status is on standby until it is required to perform its intended function. As such, its performance is highly dependent on proper installation and post-installation testing. Guidance on this subject is contained in RTCA DO-182, *Emergency Locator Transmitter (ELT) Equipment Installation and Performance* or in Chapter 6 of EUROCAE ED-62A, *Minimum operational performance specification for aircraft emergency locator transmitters 406 MHz and 121.5 MHz (Optional 243 MHz)*.

4. Limitations

Any limitations defined by the equipment manufacturer apply.
In the case of rotorcraft approved for NVIS, if cockpit panels are to be inserted, the change cannot be considered an SC.

5. Manuals

Amend AFM with AFMS containing or referencing the equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

7. Registration of the ELT

The ELT has to be registered in the national Cospas-Sarsat register in accordance with the procedures published by the State of Registry.

Standard Change CS-SC102a

INSTALLATION OF DC POWER SUPPLY SYSTEMS (PSS) FOR PORTABLE ELECTRONIC DEVICES (PED)

1. Purpose

Installation of DC power supply systems (DC-PSS) which connect aircraft electrical power to portable electronic devices (PED).

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-1B, Chapter 11.

Additionally the following applies:

— Any modification of electrical wiring is performed in accordance with acceptable practices such as the aircraft maintenance manual or FAA Advisory Circular AC 43.13-1B, Chapter 11;

— The design of the DC-PSS and its installation shall:

- provide circuit protection (e.g. circuit breakers) against system overloads, smoke and fire hazards resulting from intentional or unintentional systems shorts, faults, etc.;
- provide a clearly labelled ‘on/off switch’ for deactivating the entire DC-PSS, easily accessible by the pilot in command in flight.

  Note: the use of circuit breakers as switches is not acceptable as it can degrade their protection function, except for switch-rated circuit breakers provided that it is shown to be appropriately rated for the number of switch cycles expected during the service life of the system or of the circuit breaker;
- The on/off switch is not mandatory for USB outlets provided that the PEDs power supply cables are easily accessible in flight to be disconnected from the USB outlets at any time by the crew member;
- The socket installation shall be such as to prevent the ingress of fluid and also to minimise the possibility that conductive objects could be inserted into the socket;
- When installed in the cockpit:
  - the DC-PSS shall not affect the proper operation of the magnetic direction indicator;
  - the DC-PSS shall not impair access, view or operation of cockpit controls or instruments; and
  - the DC-PSS shall not unduly impair the external view of the pilot.

— If there are essential power supplied systems or equipment, i.e. systems or equipment necessary for continued safe flight and landing; then:

- the DC-PSS shall be powered from a non-essential supply (bus bar) of the aircraft;

- an electrical load analysis (ELA) or electrical measurements shall be undertaken, taking into account the maximum loading that may be utilised from the PSS for PED to substantiate that the aeroplane's electrical power generating system has sufficient capacity to safely provide the maximum amount of power required by the PSS for PED. This assessment shall be recorded in the Form 123; and
- After installation, a full aircraft EMI test shall be performed in accordance with FAA Advisory Circular AC 43.13-1B, Chapter 11

— The equipment is qualified for the environmental conditions to be expected during normal operation;

— Instructions and tests defined by the equipment manufacturer shall be followed.

4. Limitations

This SC does not cover the approval of the use of portable electronic devices. The responsibility of establishing the suitability of use of PEDs on an aeroplane model remain with the operator/pilot in command.

This SC only allows the installation of DC-PSS with a maximum power per outlet limited to 20 watts.

Any limitation defined by the equipment manufacturer applies.

5. Manuals

If needed, amend the AFM with AFMS containing equipment instructions for operation including the maximum load that can be connected to the DC-PSS, as required.

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC103a

EXCHANGE OF INTERIOR MATERIAL COVERING FLOOR, SIDEWALL AND CEILING

1. Purpose

Exchange of existing interior material covering floor, sidewall, and ceiling.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft, and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 23-2A Change 1

Interior material (e.g. carpets) can be replaced by new materials (e.g. carpets) under the following conditions:

— the shape is taken from the original OEM material installed in the aircraft;

— the same attachment method is used as for the OEM installation;

— impact on weight and balance needs to be considered; and

— 'flame resistant' capability of the material installed on aircraft other than gliders, motor-powered gliders, LSA, and balloons must be demonstrated. 'Flame resistant' capability can be demonstrated by:

  - compliance with 'flame resistance' requirements proven by means of FAA AC 23-2A Change 1 §8 b, or equivalent, and documented by appropriate test reports released by the material suppliers, or
  - compliance with any other more stringent flammability tests (e.g. vertical tests of FAR/CS-25 Appendix F), or
  - successful execution of the following 'Flame Resistant' tests referenced or recorded in EASA Form 123:

'Flame Resistant' test

a. Test specimens. Three specimens, approximately four-inches wide and 14 inches long, should be tested. Each specimen should be clamped in a metal frame so that the two long edges and one end are held securely. The frame should be such that the exposed area of the specimen is at least two-inches wide and 13 inches long, with the free end at least 0,5 inch from the end of frame for ignition purposes. In the case of fabrics, the direction of the weave corresponding to the most critical burn rate should be parallel to the 14 inch dimension. A minimum of 10 inches of the specimen should be used for timing purposes and approximately 1,5 inches should burn before the burning front reaches the timing zone. The specimen should be long enough so that the timing is stopped at least 1 inch before the burning front reaches the end of the exposed specimen.

b. Test procedure. The specimens should be supported horizontally and tested in draft-free conditions. The surface that will be exposed when installed in the aircraft, should face down for the test. The specimens should be ignited by a Bunsen or Tirrill burner. To be acceptable, the average burn rate of the three specimens must not exceed 4 inches per minute.

Alternatively, if the specimens do not support combustion after the ignition flame is applied for 15 seconds, or if the flame extinguishes itself and subsequent burning without a flame does not extend into the undamaged areas, the material is also acceptable. (Federal Specification CCC-T- 191b, Method 5906, may also be used for testing materials of this type, but the material should not exceed the above 4 inches per minute burn rate.)

4. Limitations

Firewall coverings are excluded.

5. Manuals

N/a

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC104a

INSTALLATION OF LIGHTWEIGHT IN-FLIGHT RECORDING SYSTEMS

1. Purpose

This SC covers inside installations of lightweight in-flight recording systems. Lightweight in-flight recording systems record flight data, cockpit audio or cockpit images, or a combination thereof, in a robust recording medium primarily for the purposes of operational monitoring, training, and incident analysis. They may also provide valuable data in the case of an accident investigation.

The installation of additional batteries is not covered by this SC.

This SC does not cover the installation of external antennas (see CS-SC004, which may be applied concurrently).

This SC is not suitable for deployable[6] equipment.

Note: lightweight in-flight recording systems may encompass information collection and monitoring systems specified in CS-ETSO 2C-197. However, in-flight recording systems are not required to be compliant with CS-ETSO 2C-197.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-2B Chapter 2 for any eligible aircraft, or

— For ELA2, CS-SC403a if the equipment is self-contained, has internal batteries and no external wiring,

Additionally, the following applies:

— The equipment is qualified for the environmental conditions to be expected during normal operation;

— The equipment relies exclusively on its own sensors, microphones, cameras and antennas for getting data and it has no data connection to the systems, instruments or sensors of the aircraft;

— If the equipment power supply does not rely on internal batteries, it meets the electrical requirements set in Chapter 2 of FAA Advisory Circular AC 43.13-2B;

— A written statement made by the equipment manufacturer is available confirming that:

  - the recording function of the equipment stores data on a non-volatile memory medium;
  - the memory used for recording is managed in a way such that there is always sufficient memory space to record (e.g. circular recording);
  - only standard data compression is used, if any;
    - no data encryption is used;
    - appropriate documentation to decode the recorded data is provided for free to equipment owners;

[6] As per EUROCAE ED-155 'Minimum Operational Performance Specification for lightweight flight recording systems', 'A deployable recorder is any robust recording system (ADRS, CARS or other) which is designed to be automatically separated from the aircraft only in the event of an accident.'

— Instructions and tests defined by the equipment manufacturer are followed.

4. Limitations

— Any limitations defined by the equipment manufacturer apply.

— The maximum weight of the equipment does not exceed 300 g.

— The equipment installation cannot be used to extend the operational capability of the specific aircraft or to give credit for meeting a flight recorder carriage requirement.

5. Manuals

Amend AFM with AFMS containing or referencing the equipment instructions for operation, as required.
Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC105a

INSTALLATION OF MOUNTING SYSTEMS TO HOLD EQUIPMENT

1. Purpose

This SC is for the installation of 'mounting systems' that are intended to hold pilot's equipment inside the cockpit or the cabin. This SC only addresses the mechanical installation.

Note: This SC does not apply to hand-held carry-on cameras, nor to devices worn by the pilot, e.g. helmet-mounted cameras.

2. Applicability/Eligibility

This SC is applicable to ELA2 aeroplanes.

3. Acceptable methods, techniques, and practices

For the purpose of this SC, the following definitions apply:

— 'installer' means the person who releases the aircraft to service in accordance with AMC M.A.801 (and who carries out this SC);

— 'mounting system' means the structural provisions such as suction mounts, brackets, clamps or any attachments which are fastened or bonded and installed in the aircraft through this SC;

— 'equipment' means the equipment that is used and installed by the pilot on the mounting system defined above in accordance with the data established and released by the installer; and

— 'unit' means the 'equipment' plus the 'mounting system'.

Installation conditions:

— If the unit is fitted in or near the cockpit, it must not interfere with any cockpit controls, nor obstruct the pilot's view of the instruments, or the pilot's external view, and it must not cause a distraction.

— The mounting system must be installed on one of the fixed surfaces of the aircraft, i.e. not on any control system components that are subject to motion. There must be no interference with the flight controls.

— Where brackets, clamps and/or attachments are used, care must be taken to ensure that they do not damage the aircraft structure that carries flight loads.

— If existing airframe structural fastener locations are picked up, then any additional installed brackets of the mounting system should be of the same material as the underlying structure, and the new attachment bolts will need to be of sufficient length to maintain safety and to maintain suitable thread engagement and protrusion. However, it should be ascertained that no external or internal parts or systems, including the flight controls, could be fouled or obstructed by employing longer fasteners. Note that no part of the mounting system should be introduced that acts as a packer between any major load paths, e.g. where a 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 the release to service of the aircraft by the installer.

— If suction mounts are used inside the cockpit or cabin, a suitable secondary retaining lanyard or strap should be attached to the unit to prevent any damage or a control jam if the primary suction mount becomes detached.

— The equipment that is mounted on the holding structural provisions in occupied areas should be installed so as to meet the requisite crash load requirements so that they will not detach, or become loose and cause injury to the occupants during operation or 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 load.

— Push/Pull test requirement: the equipment should be weighed prior to installation and checked to ensure that the total unit mass does not exceed 300g. Installers are advised to record the mass of the mounting system in a visible area.

— In order to check the security of the mounting system in flight, ground and emergency landing cases, a spring balance or another suitable method should be used to independently apply loads to the mounted unit of at least:

  - 9 times the weight of the unit forwards,
  - 4.5 times the weight of the unit upwards,
  - 6 times the weight of the unit downwards,
  - 3 times the weight of the unit to port,
  - 3 times the weight of the unit to starboard.

  Loading should be applied for at least 3 seconds with no failures, damage or permanent deformation. Higher load factors should be considered to be appropriate for aerobatic use and should include a downwards case of 9 times the weight of the unit.

— When a suction mount is used, pull testing should be used to confirm the integrity of the secondary retention to at least 10 times the weight of the unit. Periodic rechecking of the primary mount integrity is advised.

— Proprietary self-adhesive mounts can be used in accordance with the manufacturer's instructions provided that they are capable of passing the pull tests. Installation of a secondary independent lanyard/strap retention feature may also be considered to be prudent when using these types of mounts.

Additionally, the following considerations apply:

— As part of applying this SC, the installer shall:

  - define and record the locations where the mounting systems can be installed on the individual aircraft, ensuring that the installation does not impede the rapid evacuation of the occupants; and
  - list the acceptable and tested mounting systems, their weights, and the part numbers or other means by which they are identifiable.

— In the particular case of balloons and rotorcraft, pull tests shall:

- be performed on all locations where a camera can be installed; and
- be performed in all possible landing directions, including vertically downwards (-z).

— No items with sharp edges shall be installed in close proximity to the head of any occupant.

4. Limitations

— Any limitations defined by the equipment manufacturer apply.

— The total mass of the unit shall not exceed 300 g.

5. Manuals

Amend the AFM to reference the instructions for operation and the mass of the mounting system, as required.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required. There is a concern that self-adhesive mounts may be subject to environmental deterioration, especially for installations that are used over long periods. Therefore, periodic inspections on the whole mounting system shall be mandated and, if there are signs of deterioration, a pull test of the strength and integrity of the unit shall be performed. Parts that show signs of deterioration must be rectified or replaced.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Note: Any mounting of an installation on the aircraft in accordance with the AFM/AFMS is not considered to be a maintenance action according to Part-M, and does not require a release to service.

Standard Change CS-SC106a

INSTALLATION OF FLIGHT TIME RECORDERS

Note: Flight time recorders record the flight time, engine time, take-offs and landings, or a combination of them, for the purpose of creating logbook entries, and for accounting. Flight time recorders that are subject to this SC are not required to be in compliance with ETSO-2C197 or equivalent standards.

Subject to the conditions of point 21.A.307(c) of Annex I (Part 21) to Regulation (EU) No 748/2012, they may be installed without EASA Form 1.

1. Purpose

This SC is for the installation of flight time recorders without affecting any aircraft systems or installing any new data acquisition points.

The installation of additional batteries is not covered by this SC.

This SC does not cover the installation of external antennas (see CS-SC004, which may be applied concurrently).

2. Applicability/Eligibility

This SC is applicable to ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapters 1, 2, 11 and 12.

Additionally, the following conditions apply:

— The design of the equipment installation must take into account crashworthiness, the arrangement and visibility of the installation, any interference with other equipment, the jettison of the canopy, and the emergency exit.

— The design of the equipment installation must take into account the structural integrity of the instrument panel or any other attachment point. Special consideration is necessary for equipment that is installed in a location behind the occupant(s).

— Data bus/data connectivity between the flight time recorder and any other equipment that is ETSO-authorised or approved in accordance with point 21.A.305 is not allowed.

— The equipment must be suitable for the environmental conditions that are to be expected during normal operation.

— Instructions and tests defined by the equipment manufacturer have to be followed.

— Perform an EMI test to assess any interference by the flight time recorder with other systems, provided that the flight time recorder emits transmissions during flight.

— The mounting system may be installed by following the provisions of CS-SC105.

Note: Lightweight in-flight recording systems may encompass the information collection and monitoring systems that are specified in ETSO-2C197. However, in-flight recording systems are not required to be compliant with ETSO-2C197.

4. Limitations

— Any limitations defined by the manufacturer of the flight time recorder apply.

— The flight time recorder cannot be used as a substitute for the logbook record requirements that are mandated by Commission Regulation (EU) No 965/2012[7] and Commission Regulation (EU) No 1178/2011[8] (e.g. points CAT.GEN.MPA.180, FCL.130.S, FCL.710, FCL.720 and FCL.135.A).

— GSM, UMTS, LTE, or similar transmission functions whose output power is unknown or is greater than 100 mW shall be switched off during flight.

— The embodiment of this SC cannot affect any other aircraft systems or involve the installation of any new data acquisition points.

5. Manuals

— Amend the AFM with an AFMS that contains or references the equipment instructions for operation and any reference to the applicable limitations (refer to paragraph 4 above), as required.

— Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

[7] Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0965&from=EN).

[8] Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1524553458669&uri=CELEX:02011R1178-20160408).

Standard Change CS-SC107a

INSTALLATION OF CARBON MONOXIDE DETECTORS

1. Purpose

This SC is for the installation of CO detectors, either as panel-mounted devices or by a semi-permanent installation of 'lifesaver' badges by the use of adhesives.

The exchange of CO detectors that were installed as part of the type design or other approved installations is not covered by this SC.

Note 1: If the installation requires additional brackets, please also refer to CS-SC105, which may be applied concurrently.

Note 2: CO is a toxic, odourless and tasteless gas produced by the incomplete combustion of fossil fuels. Dangerous levels of CO can be produced by internal combustion engines or by any poorly vented or improperly adjusted fuel-burning appliances. Exposure to CO may cause sickness, headaches, or even death. CO detectors can save a pilot's life.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

3. Acceptable methods, techniques, and practices

For the purpose of this SC, the following definitions apply:

— 'installer' means the person who releases the aircraft to service in accordance with AMC M.A.801 (and who carries out this SC);

— 'panel-mounted´ means that 'spare, free' panel holes in the cockpit are used for the mounting;

— 'unit' means the 'detector' plus the 'mounting system'.

Installation conditions:

— If the unit is fitted in or near the cockpit, it must not interfere with any cockpit controls, and not obstruct the pilot's view of the instruments, or the pilot's external view, or cause a distraction.

— The mounting system must be on the fixed surfaces of the aircraft, i.e. not on any control system components that are subject to motion. There must be no interference with the flight controls.

— Where brackets, clamps and/or attachments are used, care must be taken to ensure that they do not damage the aircraft structure that carries flight loads.

— The equipment that is mounted on the holding structural provisions, other than for CO badges in occupied areas, should be installed so as to meet the requisite crash load requirements so that the equipment will not detach or become loose and cause injury to the occupants. For such installations, CS-SC105a should be followed, including the push/pull test requirements.

— The equipment manufacturer's installation instructions and testing provisions, if any, have to be followed.

— For self-adhesive CO badge detectors:

- as they normally are required to be replaced after a certain time in operation, the installation of a backplate is recommended, as the adhesive may interfere with the aircraft structure; and
- the installer should record the expiry date of the detector, if any, in EASA Form 123, or in the technical logbook.

Additionally, the following considerations apply:

— As part of applying this SC, the installer shall:

- define and record the location of the CO detector on the aircraft; and
- list the acceptable and tested mounting system, its weight, and if it is not a CO badge, the part number or similar identification.

4. Limitations

— Any limitations defined by the equipment manufacturer apply.

— The maximum mass of the unit shall not exceed 300 g.

5. Manuals

— Amend the AFM to reference the operating instructions and the mass of any panel-mounted detectors, as required.

— Amend the ICAs in order to:

- establish recurrent inspections to monitor the condition of the unit by checking the integrity and security of the mounting system. Parts that show signs of deterioration must be rectified or replaced; and
- establish discard intervals if they are required by the manufacturer.

6. Release to service

The first installation of a CO detector is not suitable for a release to service of the aircraft by the pilot-owner.

A pilot-owner can replace CO detection badges by following the AFMS instructions.

Standard Change CS-SC151b

INSTALLATION OF HEADRESTS

1. Purpose

A significant portion of the existing sailplane and powered-sailplane fleet is not equipped with headrests as required by the newer certification specifications. The intention of this SC is to enable the simple adaption and installation of headrests and backrests with integrated headrests that are available for similar designs using established practices.

2. Applicability/Eligibility

This SC is applicable to sailplanes including powered sailplanes as defined in ELA2.

3. Acceptable methods, techniques, and practices

— The headrest and its parts are installed and manufactured according to the design data in compliance with CS 22.788 'Headrests'.

— Modified attachments are assessed or tested against the loads referred to in CS 22.788.

— Any interference with controls needs to be assessed, and this also applies for the empty seat in the case of a two-seater.

— Adaptions are made using established repair practices, as described in:

- the maintenance or repair manual;
- 'Kleine Fiberglas Flugzeug Flickfibel' by Ursula Hänle[9]; and
- FAA AC 43.13-2B/1B.

4. Limitations

N/A

5. Manuals

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

[9] Available under http://www.dg-flugzeugbau.de/flickfibel-d.html. Also available in English under the title 'Plastic Plane Patch Primer'.

Standard Change CS-SC152b

CHANGES TO SEAT CUSHIONS INCLUDING THE USE OF ALTERNATIVE FOAM MATERIALS

1. Purpose

This SC is for the installation of alternative materials in the construction of seat cushions. For the refurbishment of seats with new seat cushions, alternative foam materials can be used.

2. Applicability/Eligibility

This SC is applicable to aeroplanes and to rotorcraft that are not complex motor-powered aircraft, and to any ELA2 aircraft.

This SC is not applicable for installations in/on dynamically tested seats (according to CS 23.562, CS 23.2270 or equivalent).

Note: In cases of uncertainty, check with the TC or STC holder.

3. Acceptable methods, techniques, and practices

(a) The following standard contains acceptable data:

— FAA Advisory Circular AC 23-2A, Change 1.

(b) Seat cushions can be changed, including using new materials, under the following conditions:

(1) The design of exchange seat cushions should follow the geometrical dimensions of the original seat cushions.

(2) If the geometrical dimensions are altered, it must be ensured that access to and egress from the seat will not be altered. On pilot seats, it must be ensured that the new cushion has no influence on the use of any of the controls.

(3) The ‘flame-resistant’ capability of the material installed on aircraft other than sailplanes, motor-powered sailplanes, LSAs, and balloons must be demonstrated. The ‘flame-resistant’ capability can be demonstrated by:

(i) compliance with the ‘flame-resistance’ requirements proven by means of FAA AC 23-2A Change 1 §8 b, or the equivalent, and documented by appropriate test reports released by the material suppliers; or

(ii) compliance with any other more stringent flammability tests (e.g. the vertical tests of FAR/CS-25 Appendix F); or

(iii) the successful execution of the following ‘Flame Resistant’ test, referenced or recorded in EASA Form 123:

‘Flame Resistant’ test

(A) Test specimens. Three specimens, approximately 4 inches wide and 14 inches long, should be tested. Each specimen should be clamped in a metal frame so that the two long edges and one end are held securely. The frame should be such that the exposed area of the specimen is at least 2 inches wide and 13 inches long, with the free end at least 0.5 inches from the end of the frame for ignition purposes. In the

case of fabrics, the direction of the weave that corresponds to the most critical burn rate should be parallel to the 14-inch dimension. A minimum of 10 inches of the specimen should be used for timing purposes, and approximately 1.5 inches should burn before the burning front reaches the timing zone. The specimen should be long enough so that the timing is stopped at least 1 inch before the burning front reaches the end of the exposed specimen.

(B) Test procedure. The specimens should be supported horizontally, and tested in draught-free conditions. The surface that will be exposed, when installed in the aircraft, should face downwards for the test. The specimens should be ignited by a Bunsen or Tirrill burner. To be acceptable, the average burn rate of the three specimens must not exceed 4 inches per minute. Alternatively, if the specimens do not support combustion after the ignition flame is applied for 15 seconds or if the flame extinguishes itself and subsequent burning without a flame does not extend into the undamaged areas, the material is also acceptable. (Federal Specification CCC-T-191b, Method 5906, may also be used for testing materials of this type, but the material should not exceed the above-mentioned 4-inches-per-minute burn rate.)

To improve occupant safety, it is recommended to use energy-absorbing foams in the construction of seat cushions. Energy-absorbing foam materials have the potential to reduce the possibility of spinal injuries in cases of hard landings or minor crash landings.

4. Limitations

N/A

5. Manuals

N/A

6. Release to service

This SC may be released by the pilot-owner subject to compliance with AMC M.A.801 in the case of sailplanes, including powered sailplanes.

Standard Change CS-SC153b

EXCHANGE OF SAFETY BELTS/TORSO RESTRAINT SYSTEMS

1. Purpose

Exchange of safety belts/torso restraint systems.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft, and any ELA2 aircraft.
This SC is not applicable for installation in/on dynamically tested seats (according to CS 23.562 or equivalent).
Note: In case of uncertainty, check with the TC or STC holder.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 9.

Additionally, the following applies:

— the equipment is authorised in accordance with ETSO-C22g or ETSO-C114 A1, or later amendments, or equivalent;

— the equipment is compatible with the existing installation and attachment points;

— the equipment is qualified for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the equipment manufacturer have to be followed.

4. Limitations

Any limitations defined by the equipment manufacturer apply.

5. Manuals

Amend the Instructions for Continuing Airworthiness to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC201b

EXCHANGE OF POWERPLANT INSTRUMENTS

1. Purpose

This SC is for the exchange of powerplant instruments for new ones, and it is applicable to:

— temperature instruments;

— fuel and oil quantity instruments;

— fuel flowmeters;

— manifold pressure instruments;

— tachometers (rpm);

— pressure instruments; and

— carbon monoxide detector instruments.

This SC does not permit the installation of digital multifunction displays.

2. Applicability/Eligibility

This SC is applicable to piston-engined aeroplanes with MTOMs of less than 2 730 kg, and to ELA2 aircraft.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data:

— FAA Advisory Circular AC 43-13-2B, Chapter 2.

Additionally, the following conditions apply:

— The instrument is authorised according to the applicable ETSO or the equivalent.

— The instrument has the same minimum functionality, is installed in a similar location, and is compatible with the existing installation.

— The display of information is consistent with the overall flight deck design philosophy.

— The instrument is suitable for the environmental conditions to be expected during normal operation.

— The indicators have the markings (e.g. limits, operating ranges) that were required on the original instrument.

— The selection/calibration of the instrument must be such that, under the same conditions, the indications provided by the old and the new instrument are the same.

— The instructions and tests defined by the instrument manufacturer have to be followed.

— The instrument should provide the measurement of the related magnitude in the same units as the instrument for which it was exchanged, or in other units when such units are used in the AFM, and the related placards have been updated as necessary.

4. Limitations

Any limitations defined by the instrument manufacturer apply.

Any limitations of the existing installation remain valid.

5. Manuals

Amend the AFM with an AFMS that contains or references the operating instructions for the instrument, as required.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC202b

USE OF AVIATION GASOLINE (AVGAS) UL 91

1. Purpose

Unleaded Avgas UL 91 (according to ASTM D7547 or Def Stan 91-90) may be used if approved for the particular engine types and the installation at aircraft level is already approved for operation with conventional Avgas or Motor Gasoline (Mogas).

Avgas UL 91 may also be used in all engines and aircraft types approved for use with Mogas RON 95 (MON 85) in accordance with Standard EN 228.

Even if approved for the engine, the operation with Avgas UL 91 is a modification at aircraft level, and placards and manuals have to be amended which could be done using this SC.

2. Applicability/Eligibility

Aeroplanes other than complex motor-powered aircraft, and powered sailplanes with spark-ignited piston engines using Avgas or Mogas.

3. Acceptable methods, techniques, and practices

To enable the use of unleaded Avgas UL 91 with this SC, the following conditions are to be met:

— the engine installed on the aircraft is approved for use of unleaded Avgas UL 91 and the aircraft is already approved for operation with conventional Avgas (according to ASTM D910, Def Stan 91-90, Mil-G-5572, GOST1012-72 or equivalent) or Mogas; or

— the engine as well as the aircraft are approved for operation with Avgas Grade 80[10]; or

— the engine as well as the aircraft are approved for operation with Mogas RON95 (MON 85) in accordance with standard EN 228;

— the installed engine has not been modified and meets the specifications of the original engine Type Certificate; and

— placards are installed/amended as needed to allow the use of the approved fuels.

Warning 1:

Use of unleaded Avgas UL 91 in engines that have not been approved for its use may cause extensive damage to the engine or lead to in-flight failure due to the lower Motor Octane Number (MON) of the fuel, compared to Avgas 100LL.

Warning 2:

This SC is not intended for approving the use of automotive fuel.

4. Limitations

None.

[10] Operating limitations may specify grade 80 Avgas in various forms including 'grade 80/87', '80 minimum', '80/87', '80', or '80 octane fuel or lower grades' as per FAA SAIB HQ-16-05R1 or later revisions.

5. Manuals

Amend AFM with AFMS introducing the aircraft operation with unleaded Avgas UL 91.

6. Release to service

The Pilot-owner may release to service the aircraft after embodiment of this SC, subject to compliance with AMC M.A.801.

Standard Change CS-SC203b

USE OF AVIATION GASOLINE (AVGAS) HJELMCO 91/96 UL AND 91/98 UL

1. Purpose

Unleaded Avgas Hjelmco 91/96 UL and 91/98 UL (meeting the requirements of MIL-G-5572 and ASTM D910 for grade 91/96 and 91/98 fuel (except of colour), as well as the requirements of ASTM D7547 and Def Stan 91-90) may be used if approved for the particular engine types, and the installation at aircraft level is already approved for operation with conventional Avgas or Motor Gasoline (Mogas).

Avgas Hjelmco 91/96 UL and 91/98 UL may also be used in all engines and aircraft types approved for use with Mogas RON 95 (MON 85) or RON 98 (MON 88) in accordance with Standard EN 228.

Even if approved for the engine, the operation with Avgas 91/96 UL or 91/98 UL is a modification at aircraft level, and placards and manuals have to be amended. This could be done using this SC.

2. Applicability/Eligibility

Aeroplanes other than complex motor-powered aircraft and powered sailplanes with spark-ignited piston engines using Avgas or Mogas.

3. Acceptable methods, techniques, and practices

Before releasing the use of unleaded Avgas Hjelmco 91/96 UL and 91/98 UL with this SC, the following conditions are to be met:

— the engine installed on the aircraft is approved for use of unleaded Avgas 91/96 UL or 91/98 UL (or UL 91) and the aircraft is already approved for operation with conventional Avgas (according to ASTM D910, Def Stan 91-90, Mil-G-5572, GOST1012-72 or equivalent) or Mogas, or;

— the engine as well as the aircraft are approved for operation with Avgas Grade 80[11]; or

— the engine as well as the aircraft are approved for operation with Mogas RON 95 (MON 85) or RON 98 (MON 88) in accordance with standard EN 228;

— the installed engine has not been modified and meets the specifications of the original engine Type Certificate; and

— placards are installed/amended as needed to allow the use of the approved fuels.

Warning 1:

Use of unleaded Avgas 91/96 UL or 91/98 UL in engines that have not been approved for their use may cause extensive damage to the engine or lead to in-flight failure due to the lower Motor Octane Number (MON) of the fuel, compared to Avgas 100LL.

Warning 2:

This SC is not intended for approving the use of automotive fuel.

4. Limitations

[11] Operating limitations may specify grade 80 Avgas in various forms including ‘grade 80/87’, ‘80 minimum’, ‘80/87’, ‘80’, or ‘80 octane fuel or lower grades’ as per FAA SAIB HQ-16-05R1 or later revisions.

None.

5. Manuals

Amend AFM with AFMS introducing the operation of unleaded Avgas Hjelmco 91/96 UL and 91/98 UL (unless the use of Avgas UL91 is already approved).

6. Release to service

The Pilot-owner may release to service the aircraft after embodiment of this SC, subject to compliance with AMC M.A.801.

Standard Change CS-SC204a

INSTALLATION OF EXTERNAL POWERED ENGINE PREHEATER

1. Purpose

This change is related to the installation of engine preheating systems that are externally powered and not connected to the aircraft electrical system. These preheating systems do not function during flight. The consideration with respect to safety of flight is that the preheating system neither interferes with functional equipment nor comes loose or detached and creates some other flight hazard. The engine preheater is installed on a non-functional, non-hazardous basis.

2. Applicability/Eligibility

Aeroplanes other than complex motor-powered aircraft, rotorcraft not being complex motor-powered aircraft, and piston engine powered sailplanes.

3. Acceptable methods, techniques and practices

Installation of the preheating system in accordance with the installation instructions of the equipment manufacturer.

4. Limitations

None.

5. Manuals

Amend AFM with AFMS explaining the operation of the engine preheating system.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC205a

INSTALLATION OF FUEL LOW LEVEL SENSOR (FLLS)

1. Purpose

This SC covers the new installation of fuel low level sensors (FLLS) and related fuel low level caution light for aircraft not already equipped with a similar system or integral fuel tanks.
Exchange of FLLS is not covered by this SC.

2. Applicability/Eligibility

ELA1 aeroplanes certified only for VFR operations.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— The installation of the FLLS shall not introduce ignition source in the fuel tank and shall be installed in accordance with acceptable practices such as the aircraft maintenance manual or FAA Advisory Circulars AC 43.13-1B Chapter 8, Section 2, 'Fuel Systems' and AC 43.13-2B;

— The system shall be suitable for the environmental conditions to be expected during normal operation (fuel, electrical system, etc.);

— In case of multi-tank fuel system, the installation must be done at least on each tank directly feeding an engine and the fuel flow logic should be adequately considered;

— Instructions and tests defined by the system manufacturer shall be followed;

— The FLLS installation shall not interfere with previously installed fuel measurement system;

— Installation of the FLLS shall be done such that the caution amber light to be installed on the instrument panel is triggered when the remaining usable fuel quantity per tank reaches the quantity needed for running the engine not less than 30 minutes at maximum continuous power per tank;

— Installation shall be verified by filling up empty fuel tank on ground with the aircraft at normal flight level attitude to measure the usable fuel quantity when the caution light is triggered. Manufacturer instructions and information, such as unusable fuel and fuel consumption at maximum power, shall be considered when calculating the remaining time before starvation. The calculated time, which should be close to 30 minutes, shall be quoted in the placard in the vicinity of the fuel low level caution light.

4. Limitations

— Any limitation defined by the equipment manufacturer applies.

5. Manuals

The AFMS shall, at least, contain:

— the system description, operating modes and functionality;

— limitations, warnings and placards at least for the following;

- 'For situational awareness only' and
- remaining time at maximum continuous power;

— emergency and normal operating procedures, as required.

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC206a

EXCHANGE OF FIXED-PITCH WOODEN PROPELLERS

1. Purpose

This SC is for the exchange of a fixed-pitch wooden propeller for a similar fixed-pitch wooden propeller.

2. Applicability/Eligibility

This SC is applicable to ELA2 aeroplanes with fixed-pitch wooden propellers.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— The propeller manufacturer's installation instructions and testing, if any, have to be followed.

Additionally, the following conditions apply:

— The number of blades, the mass, speed, diameter, gradient, twist, cord and tip shape, but also such main parameters as the centring hole, pitch circle diameter, and the number and diameter of the mounting bolts of the new propeller must be the same as those of the original propeller or must be permitted by the following Table 1 'maximal tolerances' of the original propeller.

Parameter	Tolerance	Remarks
Mass	± 10 %	
Rotational speed	+ 0 /– 50 rpm	
Diameter (R)	+0 / – 2 cm	Related to design data
Pitch	+ 0 / – 10 cm	
Cord, Twist	± 5 %	Each over the length of the propeller
Tip shape	Rounded or squared	Change from squared to rounded is allowed

Table 1 — Maximal tolerances

— The new propeller shall be type-certified by EASA, i.e. listed on the EASA Propeller Product List.

— A reissue of the noise certificate (EASA Form 45) by the competent authority is required.

The installer has to coordinate with the EASA Noise Department to ensure that the Noise Database is updated by sending the following information to noise@easa.europa.eu:

— the designation of the propeller,

— its diameter, and

— its pitch.

On EASA Form 45, state under 'Remarks': 'Propeller similarities demonstrated in accordance with CS-SC206a.'

4. Limitations

Any limitations defined by the propeller manufacturer apply.

5. Manuals

Amend the AFM with an AFMS that contains or references the operating instructions for the propeller, as required.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC207a

EXCHANGE OF THE FUEL CYLINDERS ON HOT-AIR BALLOONS

1. Purpose

This SC is for the exchange of hot-air balloon fuel cylinders.

2. Applicability/Eligibility

This SC is applicable to hot-air balloons as defined in ELA2, which are used in non-commercial operations.

3. Acceptable methods, techniques, and practices

The following considerations apply:

— The new fuel cylinder must be part of an EASA-approved balloon type design.

— The installation must take into account the approved configuration in accordance with the respective FM.

— The installation must take into account any interference with other equipment.

— The design of the equipment installation must take into account the structural integrity of the attachment point. Therefore, the new cylinder must be similar in length to, and not heavier than, the one that was originally approved.

— The owner is responsible for the continued airworthiness of the changed configuration, and the aircraft maintenance programme must be amended to include the new fuel cylinder(s).

— The equipment list must be amended in accordance with AMC M.A.801 to record the new fuel cylinder(s).

It is recommended to equip the fuel cylinders with quarter-turn ball valves as described in EASA SIB No.: 2018-14.

4. Limitations

— The fuel cylinder must be accompanied by an EASA Form 1, or an equivalent airworthiness certificate, or be listed in the equipment list associated with a valid airworthiness review certificate.

— Any limitations defined by the fuel cylinder manufacturer apply.

— The new fuel cylinder must be compatible with the existing fuel hose connectors.

— Modifications to the fuel cylinder or the fuel system are not permitted.

5. Manuals

The FM Supplement must, at least, contain:

— a description of the system, its operating modes and its functionality;

— the limitations and warnings;

— the normal and emergency operating procedures; and

— the ICAs.

The instructions of original equipment manufacturer for the exchanged fuel cylinder, for continued airworthiness, and for airworthiness limitations, remain applicable and must be applied.

6. Release to service

This SC may be released by the pilot-owner subject to compliance with AMC M.A.801.

Standard Change CS-SC251b

INSTALLATION OF AN ANGLE OF ATTACK (AOA) INDICATOR SYSTEM

1. Purpose

This SC applies only to a supplemental AoA indicator system, not to the AoA system required for the aircraft type certification.

2. Applicability/Eligibility

Sailplanes including powered sailplanes and aeroplanes not considered complex motor-powered aircraft.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Memo AIR100-14-110-PM01

Note: as an alternative to the FAA approval letter referred to in the FAA Memo, Part-66 approved certifying staff may accept also a declaration of compliance with the ASTM F3011-13 standard issued by the manufacturer of the AoA to be installed.

Additionally, the following applies:

— the installation of the system neither requires an interface with the pitot-static system nor relies on direct pressure input from the pitot-static system;

— the probe is located in such a way that it interferes neither with the functioning of the flight controls nor with the pitot-static system or aircraft stall warning system;

— accuracy of stall indication coincides with existing stall warning;

— the installed AoA indicator system shall not interfere negatively with previously installed stall warning or AoA systems;

— the installation of the probe is in a non-pressurised area, preferably on an inspection panel;

— the system is not used as an input source to any other system, such as an AFCS, stick pusher, envelope protection system or comparable function, unless certified separately;

— the installation and electrical wiring is installed in accordance with acceptable practices such as the aircraft maintenance manual or FAA Advisory Circulars AC 43.13-1B and AC 43.13-2B;

— the system is suitable for the environmental conditions to be expected during normal operation; and

— instructions and tests defined by the system manufacturer have to be followed.

4. Limitations

The provided information is used in an advisory or supplementary manner (no hazard, no credit basis).

No operational credit may be taken for the installation, such as reduced stall speeds, reduced approach speeds, reduced take-off or landing distances, etc.

Any limitations defined by the AoA system manufacturer apply. Install the limitation placards, as required.

5. Manuals

The AFMS shall, at least, contain:

— the system description, operating modes and functionality;

— limitations, warnings and placards; and

— operating procedures .

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC401c

EXCHANGE OF BASIC FLIGHT INSTRUMENTS

1. Purpose

This SC is for the exchange of basic flight instruments for new equipment, and it is applicable to:

— airspeed instruments;

— turn and slip instruments;

— bank and pitch instruments;

— direction instruments;

— vertical velocity instruments;

— accurate time pieces (e.g. clocks); and

— pressure-actuated altimeter instruments.

This SC does not permit the installation of digital multifunction displays. However, a combination of turn and slip with bank and pitch in one display is acceptable.

2. Applicability/Eligibility

This SC is applicable to aeroplanes that are not complex motor-powered aircraft, to any ELA2 aircraft with a maximum flight altitude below FL 280, and to sailplanes, including powered sailplanes.

It is also applicable to rotorcraft that are not complex motor-powered aircraft, which have a single engine, and which are limited to day VFR only.

In the case of rotorcraft, if the instrument is to be connected to the AFCS, the change cannot be considered to be an SC.

3. Acceptable methods, techniques, and practices

The following standard contains acceptable data:

— FAA AC 43-13-2B, Chapter 11.

Additionally, the following conditions apply:

— With the exception of clocks, the instrument is authorised according to the applicable ETSO or the equivalent.

— The instrument has the same functionality, is installed in the same location, and the display of information is consistent with the overall flight deck design philosophy.

— The instrument is suitable for the environmental conditions to be expected during normal operation.

— The instrument does not introduce any glare or reflections that could interfere with the pilot's vision. This condition applies to the instrument for all operations for which certification is requested.

— The indicators have the markings (e.g. limits, operating ranges) that were required on the original instrument.

— The selection/calibration of the instrument must be such that, under the same conditions, the indications provided by the old and the new instrument are the same.

— The instructions and tests defined by the equipment manufacturer have to be followed.

— The new instrument should provide the measurement of the related magnitude in the same units as the instrument for which it was exchanged, or in other units when such units are used in the AFM, and the related placards have been updated as necessary.

4. Limitations

Any limitations defined by the instrument manufacturer apply.

Any limitations of the existing installation remain valid.

In the case of aircraft that are approved for NVIS/NVG, if cockpit panels are to be inserted, the change cannot be considered to be an SC.

5. Manuals

Amend the AFM with an AFMS that contains or references the operating instructions for the instrument, as required.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Change CS-SC402b

INSTALLATION OF SAILPLANE EQUIPMENT

1. Purpose

Installation of gliding equipment considered as a 'standard part' in accordance with AMC 21.A.303 (c) 2 (i.e. electrical variometers, bank/slip indicators ball type, total energy probes, capacity bottles (for variometers), final glide calculators, navigation computers, data loggers, barographs, cameras and bug wipers).

The installation of external antennas or additional batteries is not covered by this SC.

This Standard Change covers the installations of equipment which are not already described in another specific Standard Change.

2. Applicability/Eligibility

Sailplanes including powered sailplanes, as defined in ELA2.

3. Acceptable methods, techniques, and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43.13-2B.

Additionally, the following applies:

— the design of the equipment installation must take into account crashworthiness, arrangement and visibility, interferences with other equipment, the canopy jettison and the emergency exit;

— the design of the equipment installation must take into account the structural integrity of the instrument panel or any other attachment point. Special consideration is necessary for equipment installed at a location behind the occupant(s);

— a data bus/data connectivity between the installed equipment and other equipment which is:

- ETSO authorised (or equivalent), or
- required by the TCDS, AFM or POH,
- required by other applicable requirements such as those for operations and airspace, or
- mandated by the respective MEL, if this exist;

is not allowed unless the equipment being installed is explicitly listed as compatible equipment by the manufacturer of the equipment to be connected to;

— fuses or circuit breakers are to be used when connecting the sailplane equipment with the electrical system;

— the electrical load of the installed sailplane equipment should be considered; in case of a powered sailplane equipped with a generator by an electrical load analysis;

— a switch is required which allows to turn off the installed equipment independently;

— instructions and tests defined by the equipment manufacturer have to be followed; and

— the equipment is suitable for the environmental conditions to be expected during normal operation.

4. Limitations

— The provided information is used in an advisory or supplementary manner (no hazard, no credit basis).

— Any limitations defined by the equipment manufacturer apply.

5. Manuals

The AFMS shall, at least, contain:

— the system description, operating modes and functionality;

— the limitations and, warnings;

— the emergency and normal operating procedures and limitations; and

— instructions for software and database updates.

Amend ICA to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Change CS-SC403a

PROVISIONS FOR THE INSTALLATION OF LIGHTWEIGHT CAMERAS

1. Purpose

Structural provisions for the installation of internally or externally mounted lightweight cameras on aircraft. The mounted camera needs to be self-contained, with internal batteries, and no external wiring.

Note: This SC does not apply to hand-held carry-on cameras, nor to devices worn by the pilot e.g. helmet-mounted cameras.

2. Applicability/Eligibility

ELA2 aircraft.

3. Acceptable methods, techniques, and practices

For the purpose of this SC the following definitions apply:

— 'Installer' means the person releasing to service the aircraft i.a.w. AMC M.A.801 (carrying out this SC).

— 'User' means the pilot who attaches the camera to the aircraft in accordance with the data established and released by the Installer.

The following standard applies:

— CAA UK CAP 1369[12], Policy and Guidance on mounting cameras on aircraft, Appendix A, except for the maximum mass limit. The referenced light aircraft engineer (LAE) is to be substituted by the person releasing the aircraft to service i.a.w. AMC M.A.801.

Additionally the following considerations apply:

— As part of applying this SC the installer shall:

- define and record locations where a camera can be installed on the individual aircraft; and
- list acceptable and tested camera mountings, identifiable by a part number or similar.

— For cameras mounted inside the aircraft and behind occupants a pull test in the direction of flight for the primary mounting and the secondary retention, if applicable, shall be performed using at least 15 times the weight of the unit.

— In the particular case of balloons and rotorcraft, pull tests are:

- to be performed on all positions where the camera can be installed, and
- to be done in all possible landing directions, including vertically downwards (-z).

— No items with sharp edges shall be installed in the proximity of the head of any occupant.

4. Limitations

— Maximum mass of the camera including mountings shall not exceed 300 g.

— Maximum number of cameras installed on each wing and the empennage: 1 each.

5. Manuals

[12] The document is available at the following website: http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=7204

The installer shall amend the AFM by an AFMS, which indicates:

— dedicated locations where cameras can be attached;

— which combination of mountings and cameras (identified by part numbers) are suitable at each location;

— how the mounting is to be attached; and

— that GSM, UMTS, LTE, or similar transmission technologies with unknown or more than 100 mW output power shall be switched off during flight.

Based on the AFMS, cameras and their mounting systems can be attached by the user for the individual flight.

Amend ICA to establish maintenance actions/inspections and intervals, as outlined by CAA UK CAP1369, Policy and Guidance on mounting cameras on aircraft, unless the AFMS limits the duration of the camera mount attached to less than 24 hours.

A placard must be installed visible to the pilot to caution him or her about the potential effects that the installed camera might have on flight characteristics and performance.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Note: Attaching the camera to the aircraft in accordance with the AFMS is not considered as maintenance according to Part-M and does not require a release to service, as the AFMS contains detailed instructions how to attach the camera and its mounting system.

SUBPART C — STANDARD REPAIRS

LIST OF STANDARD REPAIRS

CS-SR801a — Aircraft Repair according to FAA Advisory Circular AC 43.13-1B

CS-SR802c — Repair of sailplanes including powered sailplanes, LSA and VLA

CS-SR803a — Temporary repair of canopy cracks by drilling a stopping hole

CS-SR804a — Use of alternative adhesive for repairs of wood and wooden mixed structures

Standard Repair CS-SR801a

AIRCRAFT REPAIR ACCORDING TO FAA ADVISORY CIRCULAR AC 43.13-1B

1. Purpose

This SR is issued to allow the use of FAA Advisory Circular AC 43.13-1B for repairs of aircraft with metal, composite, wood and mixed structure.

Note: Classification of the repair according to the AC is not required for SRs.

2. Applicability/Eligibility

Aeroplanes not being complex motor-powered aircraft and any ELA2 aircraft.

3. Acceptable methods, techniques and practices

The following standards contain acceptable data:

— FAA Advisory Circular AC 43-13-1B together with AC 43.13-2B, Chapter 1.

4. Limitations

— The person responsible for the design of the repair must be familiar with the applicable airworthiness requirements to determine that the repair data developed from AC 43.13-1B is appropriate for the product being repaired.

— This SR data is not applicable to metallic structure on products whose certification basis or an applicable AD includes damage tolerance based requirements.

— Where suitable TC holder approved repair data exists, this should be used before a SR is considered.

— This SR data is not applicable to critical parts, as defined in the manufacturers' data.

— For bonded repairs, the SR should not exceed a size above which the limit load cannot be sustained if the repair fails. This can be alleviated in the case of ELA1 aircraft if the person responsible for the repair has sufficient experience in the design data, materials, process, repair size and aircraft configuration.

Note: where there is any doubt as to whether following AC 43.13-1B will result in compliance with the applicable requirements, instead of applying this SR, a repair design approval in accordance with Part-21 should be obtained. Particular attention should be paid to repair designs where there is a risk of adversely affecting fatigue or aeroelastic characteristics and the recommendations of AC 43-13-1b should be followed.

5. Manuals

Assess if the repair could require the issuance of an AFMS.

Amend the Instructions for Continuing Airworthiness to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SR is not suitable for release to service by the Pilot-owner.

Standard Repair CS-SR802c

REPAIR OF SAILPLANES INCLUDING POWERED SAILPLANES, LSA AND VLA

1. Purpose

This SR is issued to allow the use of established practices for the repair of metal, composite, wood and mixed structures of light aircraft.

2. Applicability/Eligibility

This SR is applicable to sailplanes, including powered sailplanes (as defined in ELA2), LSA, and VLA.

3. Acceptable methods, techniques, and practices

Any of the following standards contain acceptable data:

for composite structures:

— ‘Kleine Fiberglas Flugzeug Flickfibel‘ by Ursula Hänle[13], or

— Seminardruck ‘Faserverbundwerkstoffe im Segelflugzeugbau’, Fortbildungsseminar des DAeC;

for wooden and mixed structures on sailplanes including powered sailplanes:

— R.C. Stafford-Allen ‘Standard Repairs to Gliders’ by the British Gliding Association[14], or

— ‘Werkstattpraxis für den Bau von Gleit- und Segelflugzeugen‘ by Hans Jacobs;

for skin only:

— ‘Manuel de Reparation Generique pour la Reparation Des Planeurs en Materiaux Composites R02-15-A01, indice B’[15], issued by Federation Francaise de Vol a Voile[16];

for general purposes:

— ‘Grundlagen der Luftfahrzeugtechnik in Theorie und Praxis’, Band II Verlag TÜV Rheinland GmbH, ISBN Nr.: 3-88585-001-X, or

— ‘Grundlagen der Luftfahrzeugtechnik in Theorie und Praxis’, Band V: Segelflugzeuge und Motorsegler, Verlag TÜV Rheinland GmbH, ISBN Nr.: 3-8249-0351-2.

4. Limitations

— The person responsible for the design of the repair must be familiar enough with the applicable airworthiness requirements to determine that the repair data developed from the references in paragraph 3 above is appropriate to the product being repaired.

— Where suitable TC holder approved repair data exists, this should be used before an SR is considered.

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13 Available under http://www.dg-flugzeugbau.de/flickfibel-d.html. Also available in English under the title ‘Plastic Plane Patch Primer’.

14 Available under https://members.gliding.co.uk/library/standard-repairs-to-gliders

15 ‘Indice B’ contains changes agreed with EASA, subsequent amendments shall be used only if referred to in CS-STAN.

16 To retrieve the document refer to http://maintenance_navigabilite.ffvv.org/files/2017/03/manuel-de-reparation-generique-ffvv-ind-b-pour-cs-stan-easa-4.pdf

— For bonded repairs, the SR should not exceed a size above which the limit load cannot be sustained if the repair fails, unless the person responsible for the repair is sufficiently experienced with the design data, materials, process, repair size and aircraft configuration.

Note: Where there is any doubt as to whether following the references in paragraph 3 will result in compliance with the applicable requirements, instead of applying this SR, a repair design approval in accordance with Part 21 should be obtained. Particular attention should be paid to repair designs where there is a risk of adversely affecting fatigue or aeroelastic characteristics, and the recommendations of the references should be followed.

5. Manuals

Assess whether the repair could require the issue of an AFMS.

Amend the ICAs to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SR is not suitable for the release to service of the aircraft by the pilot-owner.

Standard Repair CS-SR803a

TEMPORARY REPAIR OF CANOPY CRACKS BY DRILLING A STOPPING-HOLE

1. Purpose

This SR is intended to stop further growth of a crack in a transparent canopy made from acrylic glass (often known as Plexiglas) by drilling a small hole at the end of the crack to stop increase of the crack length, as a temporary repair.

2. Applicability/Eligibility

Sailplanes including powered sailplanes, as defined in ELA2, LSA, and VLA.

3. Acceptable methods, techniques, and practices

The hole diameter shall not be larger than the approximate thickness of the material (i.e. typically not larger than 2-3 mm diameter) and the centre of the hole shall be at the extension of the axis of the crack.

4. Limitations

— Where suitable TC holder-approved temporary repair data exists, this shall be applied before a SR is considered.

— Any crack repaired by a stopping-hole should be a temporary repair. An approved permanent repair should be performed as soon as practically possible to prevent further crack growth or other damage. At the latest the final repair should be performed during the next aircraft annual inspection (or the next 100 hours inspection in the case of aeroplanes);

— Repair of a crack by drilling a stopping-hole is only permitted by this SR if:

- the crack to be repaired by this SR is no longer than 10 cm (measured along the crack);
- a crack with side arms (a crack splitting into several arms) must not have more than 2 arms (2 ends) to be repaired by this SR;
- in case of more than one crack, there are not more than 3 cracks with a maximum length of 5 cm each per canopy;
- the crack to be repaired is not in the front section of the canopy (i.e. in the region where the pilot/co-pilot has to look through when looking forward);
- a crack with side arms (a crack splitting into several arms) must not have more than 2 arms (2 ends) to be repaired by this SR; and

5. Manuals

Supplement the pre-flight inspection to introduce an inspection of the crack for any growth until a permanent repair is embodied. If any growth of the crack at the end of the stopping-hole is observed, then the crack should be permanently repaired by using approved repair data before further flight.

Record in the list of deferred defects the need to permanently repair the canopy at the time of the next annual check, or, in the case of aeroplanes, at the next 100 hours inspection, whichever comes first.

6. Release to service

This SC is not suitable for release to service by the Pilot-owner.

Standard Repair CS-SR804a

USE OF ALTERNATIVE ADHESIVE FOR REPAIRS OF WOOD AND WOODEN MIXED STRUCTURES

1. Purpose

This SR is issued to enable the use of an alternative adhesive/bonding system instead of initially approved conventional wood glue systems for the gluing/bonding process of wood and wooden mixed structure repairs.

This SR is not intended to substitute the repair design and method described in the applicable instruction for continued airworthiness (such as a structural repair manual) provided by the TC holder, however, it gives the possibility to use alternative adhesives.

Note: This CS shall not limit the TC or STC holder or designer to approve different adhesives for their individual applications.

2. Applicability/Eligibility

Aeroplanes and sailplanes including powered sailplanes as defined in ELA 1.

3. Acceptable methods, techniques, and practices

The working conditions and wood conditions for the repair shall be such as the standard conditions described by the TC holder/industrial standard for wood bonding, and must be adjusted to individual conditions necessary for the alternate adhesive used, as required by the adhesive manufacturer (e.g. temperature, humidity, etc.).

The procedures of application and use as well as the restrictions given by the adhesive manufacturer in the specification and the instructions are mandatory.

4. Limitation

The use of alternative adhesive is allowed within the limitations given below, provided that this does not result in the need for a limitation on the aircraft capability:

— This SR does not cover simultaneous application of different adhesive types with different chemical properties in one single bond location (bond on bond).

— Any adhesive complying with EN 301-I-90-GF-1,5-M or equivalent standard can be used as released by the manufacturer. The adhesive must have sufficient gap filling capabilities to be within the given gap and curing pressure limits of the repair.

— For Epoxy resin based adhesive which does not fully comply or has not demonstrated conformity to EN 301-I-90-GF-1,5-M the following additional limitations apply:

- This SR is not applicable for bonding of spars; main structure beam; root ribs.
- All epoxy based bonded areas shall be limited to 50 °C operating temperature (e.g. surface of repair subject to direct sunlight has to be colored white, repair cannot be made in hot areas such as engine compartment, etc.).
- The adhesive must be defined, tested, and released by the bond manufacturer as suitable for structural wood bonding.
- Parallel quality bonding tests of each mixture preparation shall be carried out, to verify proper hardening and bonding. This may also include sampling for delamination and shear strength by coupon testing.

— The person responsible for the design and execution of the repair must be familiar enough with the use of the adhesive intended to be applied.

— The adhesive used and conditions shall be recorded in EASA Form 123 or referred documentation. This shall include adhesive type, manufacturer, charge, curing temperature.

Note: Where there is any doubt as to whether following the references in paragraph 3 will result in a non-compliance with the applicable requirements, instead of applying this SR, a repair design approval in accordance with Part-21 should be obtained. Particular attention should be paid to repair designs where there is a risk of adversely affecting fatigue, environmental conditions (such as high temperature due to color marking and painting) or aero elastic characteristics. For those cases the recommendations of the references should be followed.

5. Manuals

Amend ICA to note the areas where non-original adhesive was used for bonding and to establish maintenance actions/inspections and intervals, as required.

6. Release to service

This SR is not suitable for release to service by the Pilot-owner.

Note: *The following, not exhaustive, list is intended to advice to known adhesive products. Compliance with this Standard Repair when using referred adhesives still need to be verified.*

Adhesives compliant with EN 301-I-90-GF-1,5-M:

Aerodux 185 with Hardener HRP150/155 (dynea); Prefere 4094 (Dynea)

Epoxy resin based adhesives:

T-88 (System Tree); FPL 16 A; SP-106 (Gurit); Araldit AW134 (Ciba Geige)