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Annex 1 - Special Conditions and Equivalent Safety Finding that are part of the applicable Certification Basis not requiring publication on EASA website.

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Annex 1 – SC and ESF

Annex 1 – SC and ESF 2

SC Human Factors in Integrated Avionics Systems SC-B23.div-01 (Project reference CRI B-52)
..... 3

SC Lithium Battery Installation SC-F23.1353-02 (Project reference CRI F-58) 4

SC Fuel low level annunciation means SC-CS-23.1305 (Project reference CRI E-60) 5

SC Emergency evacuation for Air Medical service SC-CS-23.803 (Project reference CRI D-103)
..... 6

SC Usage of aeroplanes for parachuting activities SC-O23.div-01 (Project reference CRI O-08)7

ESF Ditching emergency exit (Project reference CRI E-104) 10

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SC Human Factors in Integrated Avionics Systems SC-B23.div-01 (Project reference CRI B-52)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS-23
ADVISORY MATERIAL:	-

- a) The design of the integrated flight deck interface must adequately address the foreseeable performance, capability and limitations of the pilot.
- b) More specifically, the team must be satisfied with the following aspects of the flight deck interface design:
- i. Ease of operation including automation;
 - ii. Effects of pilot errors in managing the aircraft systems, including the potential for error, the possible severity of the consequences, and the provision for recognition and recovery from error;
 - iii. Workload during normal and abnormal operation; and
 - iv. Adequacy of feedback, including clear and unambiguous:
 - presentation of information;
 - representation of system condition by display of system status;
 - indication of failure cases, including aircraft status;
 - indication when pilot input is not accepted or followed by the system;
 - indication of prolonged or severe compensatory action by a system when such action could adversely affect aircraft safety.
 - Indication of reversionary modes and back-up status

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SC Lithium Battery Installation SC-F23.1353-02 (Project reference CRI F-58)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS 23.1353
ADVISORY MATERIAL:	-

In lieu of the requirements of CS 23.1353(f), (g)(1) through (g)(3) the following requirements are applied:

- (a) Lithium batteries and battery installations must be designed and installed as follows:
- (1) Safe cell temperatures and pressures must be maintained during any probable charging or discharging condition, or during any failure of the charging or battery monitoring system not shown to be extremely remote. The Li battery installation must be designed to preclude explosion in the event of those failures.
 - (2) Li batteries must be designed to preclude the occurrence of self-sustaining, uncontrolled increases in temperature or pressure.
 - (3) No explosive or toxic gasses emitted by any Li battery in normal operation or as the result of any failure of the battery charging or monitoring system, or battery installation not shown to be extremely remote, may accumulate in hazardous quantities within the aeroplane.
 - (4) Li battery installations must meet the requirements of CS 23.863(a) through (d).
 - (5) No corrosive fluids or gasses that may escape from any Li battery may damage surrounding aeroplane structures or adjacent essential equipment.
 - (6) Each Li battery installation must have provisions to prevent any hazardous effect on structure or essential systems that may be caused by the maximum amount of heat the battery can generate during a short circuit of the battery or of its individual cells.
 - (7) Li battery installations must have a system to control the charging rate of the battery automatically so as to prevent battery overheating or overcharging, and,
 - (i) A battery temperature sensing and over-temperature warning system with a means for automatically disconnecting the battery from its charging source in the event of an over-temperature condition or,
 - (ii) A battery failure sensing and warning system with a means for automatically disconnecting the battery from its charging source in the event of battery failure.
 - (8) Any Li battery installation whose function is required for safe operation of the aeroplane, must incorporate a monitoring and warning feature that will provide an indication to the appropriate flight crewmembers, whenever the capacity and SOC of the batteries have fallen below levels considered acceptable for dispatch of the aeroplane.
 - (9) The Instructions for Continued Airworthiness must contain maintenance procedures for Lithium-ion batteries in spares storage to prevent the replacement of batteries whose function is required for safe operation of the aeroplane, with batteries that have experienced degraded charge retention ability or other damage due to prolonged storage at low SOC.
- (b) Compliance with the requirements of this Special Condition must be shown by test or, with the concurrence of EASA, by analysis.

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SC Fuel low level annunciation means SC-CS-23.1305 (Project reference CRI E-60)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS 23.1305
ADVISORY MATERIAL:	-

In order to avoid starvation situation in small aircraft, manufacturer shall provide a low fuel annunciation, in addition to the zero marking.

A fuel low level annunciation means for any fuel tank that should be depleted of fuel in normal operations. Annunciation shall provide indication to the flight crew approximately 30 minutes of usable fuel or energy remains in the tank or in storage.

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SC Emergency evacuation for Air Medical service SC-CS-23.803 (Project reference CRI D-103)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS 23.803
ADVISORY MATERIAL:	-

For non-permanent Air Medical Services installations, EASA considers that it is reasonable to assume that such patients will have reduced mobility and/or are in a reduced state of consciousness. This will impact on their ability to evacuate the aircraft unaided. Although compliance with §23.803 in the normal case assumes all passengers are fully able to themselves evacuate the cabin such an assumption has questionable validity in the case of the subject design.

It can only be anticipated that, in certain cases, evacuation of stretcher borne occupants will be significantly slower than that of other cabin occupants.

Having considered the benefit of evacuating injured or critically sick people from areas where, for many different reasons, their health and/or safety is at high risk, EASA is of the opinion that non-compliance with §23.803 can be sufficiently compensated by showing compliance with the following Special Conditions for non-permanent installations:

- In regards to seated occupants, each crew and passenger area must have emergency means to allow rapid evacuation in crash landings, with the landing gear extended as well as with the landing gear retracted, considering the possibility of the aeroplane being on fire. In regards to stretcher occupants, all practicable design precautions and operational procedures must be developed to facilitate evacuation without compromising the egress of cabin attendants and other passengers. Precautions may include features such as location relative to normal passenger seating and emergency exits, easy release of stretchers from their attachments to the a/c to enable patients to be stretcher borne to emergency exits, easily accessed patient restraint buckles to alternatively allow removal and direct carrying of patients, associated training/briefing procedures for attendants, etc. Proposed design precautions and procedures will be evaluated by the Agency for acceptability. An entry shall be made in an AFM supplement to define the procedure to be followed for the evacuation of the occupants of the stretchers.
- The transport of fare paying passengers is prohibited. This limitation will be included in the AFMS.

Whether an installation is “permanent” will be assessed by EASA on a case by case basis depending on the particular situation. As general guidance, applicants can assume that spending the majority of operating time in a given Medical Evacuation / Ambulance configuration would be considered “permanent

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SC Usage of aeroplanes for parachuting activities SC-O23.div-01 (Project reference CRI O-08)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS-23
ADVISORY MATERIAL:	FAA AC 105-2E, SIB 2018-18

In addition to basic (CS 23) code, the following requirements are applicable to an aircraft for parachuting activity:

I. General

The following information must be provided:

- (a) aircraft type and model and applicable serial numbers
- (b) Parachute jump type : automatic and/or manual release
- (c) Maximum number of parachutists to be dropped

II. Design and Structure

The following items must be substantiated:

- (a) Seating/accommodation and restraints (when installed¹) or “means to hold on” approved for use during take-off and landing
- (b) Suitability of doorway and the approach to it
- (c) Investigation of weight and CG change during and after departure of parachutists for free fall as well as static line jumping.
- (d) Strength of floor panels and occupant restraints (when installed) according to the loads conditions in CS 23.561 (b) and CS 23.785 (a). If “means to hold on” are used, instead of restraint systems, suitable loads should be defined and applied.
- (e) Strength of the external devices (handles, footsteps, etc.)
- (f) Protection of the control systems on board from contact of parachutists or their material.
- (g) Protection of any part of the aircraft interior/door likely to catch on parachutists equipment

¹The decision to use restraint systems is taken by the operator of the aeroplane as part the risk assessment required by SPO.OP.230. Guidance is available in SIB 2018-18. The design organization may support the operator in such assessment. The design organization should define the installation aspects, the attachment points to the aeroplane of the restraint systems

to the parachute harness or the attachment points of the “means to hold on” (ref. SPO.SPEC.PAR.110). The guidance of the FAA AC 105-2E and the SIB 2018-18 may be used;

- (h) Investigation of aircraft oxygen equipment if dropping from heights greater than the altitude where oxygen is required to be used by the operating rules, and method of change over to personal Oxygen system.
- (i) Investigation of possible hazards on the outside of aircraft (e.g. exhaust gas temperatures which the parachutists or his canopy might encounter)
- (j) For static line systems, investigation of
 - (i) Strength of anchor line and attachments to aircraft. Anchor point should withstand limit load of 2 x weight requirement for strength of anchor line.[F=400daN, D=1000kp; à trancher]

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- (ii) Length of static line approved for use with a particular aircraft configuration and type of parachute
- (iii) Precautions against interference of static line with aircraft control surfaces, aerals etc
- (iv) What action is taken if there is a hang up.
- (k) The specific use linked to parachuting operations must be taken into account when defining the fatigue or damage tolerance spectrum of loads.
- (l) If installed, the suitability and the strength of the pilot back seat wall (or alternative design). This should take into account the function of the wall (provide comfort to the parachutists, protect the pilot from inadvertent interference by the parachutists, etc.). Depending on the function, suitable loads should be defined and applied.

III. Flight

1. Tests for operation of the aircraft with door open or removed:

- (a) Resonance/Buffer in cabin with door open/removed.
- (b) Carbon monoxide contamination of cabin.
- (c) Hazards associated with opening the door (and in-flight depressurisation procedures if necessary), ability to close door whilst attached to safety line, security of the door in the open position
- (d) Airspeed and other limitations
- (e) Performance Implications

2. Tests for parachuting operations:

With the aid of either aircraft mounted cameras or a chase aircraft, the following must be recorded:

- (a) The dropping of a dummy or other suitable object without a parachute, in order to establish the trajectory and the effects of downwash etc
- (b) Carry out a "free" jump to assess aircraft configuration, i.e. speed, flap setting, weight, power setting, etc
- (c) Conduct repeated jumps (at least 20) by experienced teams in small groups to try various body attitudes for leaving the aircraft. At least 5 parachutist droppings must be conducted with the maximum allowable number of parachutists.
- (d) Stream static line with a drogue or bag attached and record the angle of trail.
- (e) The static line end must not interfere with or hit the surface controls or the fuselage
- (f) For static line parachuting, repeat the single trial jump and then the group jump as before and establish the length of static line appropriate to the type of parachute and this it does not cause a hazard either to the parachutists or the aircraft.
- (g) If any, check the proper functioning of the static line retraction system in flight.
- (h) Compatibility of the parachuting operation with other existing equipments (for instance, static ports, etc.)

IV. Airplane Flight Manual and placards

A specific Flight Manual Supplement must be produced, containing the following:

- (a) Limitations for operating the parachuting door, and the precautions to be taken
- (b) Authorized type of parachuting operations (automatic and/or manual release)

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- (c) Operating limitations with door open or removed, and the required operating parameters for parachute dropping
- (d) Approved static line dimensions associated with the aircraft type and the parachute type
- (e) Information specifically for the dispatcher and/or the parachutists, e.g. parachutist egress order, body attitude at departure, etc.
- (f) Dropping speed, preferably at least $1.2 \times V_S$, flap settings and engine power settings.
- (g) Maximum altitude to open door should be quoted if no oxygen system approved for this purpose. This will be applicable to aircraft capable of operation at altitudes greater than the altitude where oxygen is required to be used by the operating rules.
- (h) Other limitations and/or requirements linked to each national operational requirement.
- (i) Kind of operations allowed when the aircraft is equipped for parachuting operation

Miscellaneous markings and placards:

- (a) On the outside of the airplane, indication of parts that parachutists must not grab or upon which they must not step.

A placard with all speed limitations must be installed in clear view of the pilot

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ESF Ditching emergency exit (Project reference CRI E-104)	
APPLICABILITY:	P2012 model
REQUIREMENTS:	CS 23.601, 23.807
ADVISORY MATERIAL:	-

CS 23.807(e)(2,) requires that: Ditching emergency exits for multiengine airplanes must be provided in accordance with CS 23.807(e)(1),(2). The emergency exit on both sides of the airplane must be above the waterline in the event of a water ditching.

This ELS is raised when the aircraft configured for cargo transportation doesn't allow the access to the aft ditching emergency exits to the flight crew.

In this case, the following compensating factor to support the proposed ESF should be applied:

1. Regarding to the definition of the route of the ditching emergency egress the following rationale should be addressed to:
 - a. Evaluate the egress capabilities of the flight crew emergency exit on the LH and RH side of fuselage considering that is the first escape route; and
 - b. Evaluate the egress capability of the second escape route on the main cabin entry door, which may be used for evacuation by installing a device prior to opening the exit in the ditching procedures. A demonstration should be shown that the device could be retrieved, installed and the occupants evacuated in the analyzed flotation time. In this demonstration the device installed with the aircraft in the most adverse float attitude should be considered.
 - c. Regarding to the device design to be installed in the LH and RH side of fuselage door the following aspects should be considered:
 - i. The device design and its installation should be simple and obvious;
 - ii. The device installation should be very ease to operate such that no special training or experience is required;
 - iii. The specification of this device should be designed to react the water pressure and act as sill in the event that evacuees elect to step on rather than over the barrier panel; and
 - iv. The device geometric dimension installed should be at least to provide a clear opening on the LH and RH side emergency exits of more than 19X26 inches and; considering for the device installation the step up generated should not be more than 20 inches.
2. If is a movable device is installed the following condition should be made available:
 - a. A placard located on or immediately adjacent to the main cabin door indicating that:
 - i. The device is required to and it should be installed prior to opening the door an subsequent to a ditching; and
 - ii. Where the device stowed location is.
3. Regarding the ditching emergency procedures the following apply:

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- a. The AFM emergency section should include a ditching emergency procedure;
 - b. In the pre-flight check phase a confirmation of the water barrier is aboard of the aircraft and stowed in its designed location is required; and
 - c. A complete installation instruction on passenger briefing cards and placards on the device or close to should be addressed.
4. Regarding to the door operating mechanism under the emergency ditching condition the following apply:
- a. The force necessary to push the entry door open against the water pressure should be defined and or estimated and demonstrated within normal occupant capabilities.

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Acronyms and Abbreviations

TC	Type Certificate
TCDS	Type Certificate Data Sheet
SC	Special Condition
ESF	Equivalent Safety Findings
AMC	Acceptable Means of Compliance
GM	Guidance Material
MOC	Means of Compliance
CS	Certification Specifications
CRI	Certification Review Item

– END –

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