This document was created to make public non-proprietary data contained in Special Conditions (including Deviations, Equivalent Safety Findings) that are part of the applicable Certification Basis as recorded in TCDS EASA.IM.A.632.

Content:

B-52 (SC): Human Factors Assessment	
APPLICABILITY:	Kodiak 100 / 200
REQUIREMENTS:	Regulation EU 748/2012 - 21.A.16B
ADVISORY MATERIAL:	FAA AC 23-23, AC 23-26 and GAMA Publication No 12

SPECIAL CONDITION

Human Factors – Integrated Avionics Systems

General

a) The design of the integrated flight deck interface in particular and other systems as required, must adequately address the foreseeable performance, capability and limitations of the crew.

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

ANNEX

Appendix 1 Acceptable Means of Compliance to SC-B23.div-01

Appendix 1

ACCEPTABLE MEANS OF COMPLIANCE

Human Factors -- Integrated Avionics System

1. Demonstration of Compliance

1.1 Implementation

It is envisaged that the Flight Test Panel would manage implementation. The following is a proposal for interpretative material associated to the special condition. This will call for:

i) General Assessment: A general review of Human Factors issues arising from integrated use of the flight deck.

ii) Novel features: Careful exploration of specific Human Factors issues arising from the novel integrated avionic system in the flight deck.

1.2 It is important that the effort for consideration of human factors is focused upon any risks relevant to aircraft safety that may be raised by the novel features of the flight deck design. As clarification, some example topic areas have been suggested in italicized text beneath each of the specific criteria listed in paragraph 2.3 below. Examples are offered for illustration purposes, but evaluation against the listed criteria should not be restricted to only these examples.

1.3 The applicant should show how they have considered and applied a consistent approach across the flight deck in order to avoid confusion. This may be achieved by the use of a flight deck philosophy document that will:

a. Identify the Applicant's philosophy on design principles such as:

- Crew alerting and prioritisation of aurals
- Use of colour
- Location of controls
- Menu structures
- Crew interaction with displays
- Display reversion
- Automation principles
- System feedback to the crew

b. Identify relevant assumptions concerning use of the Flight Deck Interface, such as:

- The pilot accommodation.
- The operational environment.
- The aircraft operator [e.g., use of user modifiable checklists, presentation of planning data].

1.4 The applicant should prepare a dedicated plan for addressing human factors aspects in flight deck certification. This plan should include:

a. Identify items in the proposed design that are considered new or novel,

b. Identify how they will address the potential for crew related risk that may arise from these items, including their relationship to conventional features. For this purpose, they may select a format including each novel item:

- Novel Item name
- Risk Potential arising from crew interface
- Design Objectives in managing those risks
- How Foreseeable Performance of crew will be addressed
- How Ease of Use will be addressed
- How Effects of Error will be addressed
- How Task Distribution will be addressed
- How Adequacy of Feedback will be addressed
- Other foreseeable concerns
- How any special pilot training requirements will be addressed
- JAR / FAR paragraphs also relevant
- Certification credit events where the design will be exposed to the Team for formal evaluation of the item.

c. Show the planned development schedule including the manufacturer / customer internal assessments and 'proof of concept' activities, which may be observed by some Team members.

d. Describe the planned resources that will be available for development activity, in particular mock-ups, active representations and simulation.

1.5 Evaluation trials will need to include demanding scenarios representative of each flight phase (flight preparation, taxi, take-off, climb, cruise, approach, landing, go-around, and holding) with standard pilot tasks (flight path control, flight path management, communication, aircraft system management) and using all the available interface means (e.g. communication through data link if proposed). Scenarios shall include Normal, Abnormal and Emergency situations. The applicant should propose the means and methods by which these scenarios can be assessed in a realistic environment.

1.6 The applicant should identify, where appropriate, the recommended Pilot Operating Philosophy and the procedures.

1.7 A formal certification event should be designated by the applicant to permit an evaluation by the team in order that it might satisfy itself that compliance of the design with the Special Condition has been achieved.

2. Evaluation Criteria

For each feature to be evaluated, considerations may include:

2.1 Foreseeable Performance, Capabilities and Limitations of the Pilot

a. Occasional error is a normal characteristic of skilled human performance [e.g., where a single error would impact safety, the pilot should be supported by the design or, if not practicable, operating procedures or training].

b. Pilot capacity is not limitless in terms of working memory *[e.g. pilot should not be expected to hold in mind long alphanumeric sequences] long term memory [e.g. without regular practice, pilots training and skill may fade over time] and attention [e.g. supplemental systems may impact safety if they are slow, distracting or difficult to use; the presentation of non-functional information should be avoided; simultaneous tasks and demands on the pilot should be minimised]*

c. Established practices and conventions may influence pilot actions, especially under stressful conditions*. [e.g. if a certain location on the flight deck has been associated with a particular function in many previous aircraft, it is foreseeable that some pilots may erroneously reach to that position for the function even if trained to find it elsewhere.]*

d. Available pilot capacity may be reduced during failure conditions or under stress; hence the additional need to apply unfamiliar procedures at such a time should be avoided. This should be achieved within the design.

e. Expectation may bias pilots perception and thus important information that is contrary to expectation must be particularly explicit.

f. A high rate of false warnings is likely to reduce the effectiveness of genuine warnings.

g. Cultural differences may exist and could be relevant to some design expectations *[e.g. on use of English alphabet for sequencing;].*

2.2 Ease of Use [including Automation]:

a. Iterative involvement of test pilots and operational pilots in the development of such systems is likely to result in an improved product; this should include representations [e.g. simulation] that have a degree of realism appropriate to the level of assessment and the use of scenarios including those that are most likely to address system vulnerability and risk related situations.

b. The application of consistent philosophies may also contribute to 'ease of use'.

c. Further considerations in achieving 'ease of use' may be obtained from EN ISO 14307 on Human Centred Design Processes for Interactive Systems.

Examples: Flight Deck Philosophies that are logical and consistently applied. The design should be such that effective use by pilots is likely, giving consideration to the expected pilot training [e.g. number of VNAV modes]. CCD(Cursor control device) characteristics, including accessibility; compatibility with existing CCD conventions; resistance to inadvertent operation (e.g. by position); software control laws / gains / operating characteristics for accuracy and speed; use with right and left hand, dominant and non-dominant hand; operation under vibration / turbulent conditions;

2.3 Effects of Error:

a. The systematic evaluation of the contribution of the effects of error to safety risk in the operational environment.

b. Error in routine tasks [such as data entry or misreading digits] is a normal characteristic of human performance, and such errors are considered probable.

c. The recognition that the absence of a particular pilot error during development simulation activity does not prove that such an error can never occur in service.

Examples: To include pilot response to system failure, and also error during normal (and abnormal) operations that do not occur during a response to a failure of the system on which the error is made. It is not acceptable to assume that all errors (e.g., simple slips and lapses) can be eradicated by training.

2.4 Workload

a. The introduction of new or novel design features may potentially affect workload or awareness across time; some tasks may become more time consuming or exclusive. Such effects should be explored.

b. The quantity, similarity and function of tasks that are conducted through a single device or access point should be investigated for peaks or ‘bottlenecks’ at busy or critical periods.

c. The risk from task interruption [and potentially remaining incomplete] may also be related to design characteristics [*such as the need to withdraw from one menu to access another in an automated system*].

Examples: Time taken to access features of systems that are time critical; time taken head down during busy phases of flight (especially where lookout required); time sharing of devices for dissimilar tasks (e.g. Multi-Function Display); critical task times in comparison with previous designs; system status following interrupted tasks.

2.5 Adequacy of Feedback

a. Consistent application of feedback philosophy (Dark-Quiet, Green Light, ..).

b. Evaluation of effectiveness of method and format of feedback (look and feel).

c. Sub-categories as outlined below:

i) Presentation of information

Examples: *Symbol readability in vibrating conditions; display colour philosophy*.

ii) Representation of system condition by display of system status

Examples: *Awareness of system status despite extensive use of MFD and large number of display choices through “Windowing”; draws attention to status change.*

iii) Indication of failure cases, including aircraft status

Examples: Potential obscuration of information by pop-up menus.

iv) Indication when pilot input is not accepted or followed by the system

v) Indication of prolonged or severe compensatory action by a system when such action could adversely affect aircraft safety

Examples: *Automated flight control that may be designed such that the adjustment reaches the end of its travel before the pilot is made suddenly aware of the situation.*

– END –

E-11 (SC): Cold Soaked Fuel	
APPLICABILITY:	Kodiak 100 / 200
REQUIREMENTS:	CS 23.1093 (b), CS 23.143, CS 23.1419
ADVISORY MATERIAL:	--

SPECIAL CONDITION

Cold Soaked Fuel

The wing upper surfaces must not accumulate undetected hazardous quantities of ice caused by cold soaked fuel.

In demonstrating compliance, it is to be assessed, if potential ice accretion on wing upper surface due to the freezing of condensation caused by cold soaked fuel from the previous flight or after a prolonged exposure on ground in cold environment.

First it shall be determined if the design of the wing is such that cold soak fuel may occur during the above scenario. If it is demonstrated that the design is such that the wing upper surfaces may not accumulate hazardous quantities of ice caused by cold soaked fuel within the proposed airplane operating envelope, no further assessment is required.

If it is determined that hazardous quantities of ice caused by cold soaked fuel may accumulate prior to take-off, the following is required:

1. an indication means to warn the flight crew of the presence of hazardous quantities of ice on the wing upper surface or,
2. when Conditions conducive to cold soak fuel exist, an AFM procedures to require that the flight crew perform,
   a. a visual and tactile (hand on surface) check of the wing leading edge and the wing upper surface to ensure the wing is free from frost, ice, snow, or slush or
   b. a de-icing of aircraft

Following 2 (a) above, if frost, ice, snow or slush is present on the wing upper surface, it must be within the acceptable limits provided in the AFM. If it is not within the acceptable limits or if no limits are provided in the AFM, the AFM must require following the ground de-icing /anti-icing procedures.

ANNEX

Appendix 1	Interpretative Material to SC-E23.1093-01

Appendix 1
INTERPRETATIVE MATERIAL
to SC-E23.1093-01
Cold Soaked Fuel

A. For the purposes of this CRI, a hazardous quantity of ice is the quantity which may:

1. adversely affect the performance and/or controllability of the aeroplane
2. affect thrust and engine operating characteristics when ingested by the engine at the highest take-off thrust and at the highest speed for the aircraft, in the takeoff mode. Definition of non hazardous quantities of ice must be based on CS E test data that shows that this quantity of ice does not affect thrust and engine operating characteristics, or any other additional test data that is available and acceptable to EASA

B. For the purposes of this CRI, conditions conducive to cold soak fuel exist when the outside air temperature is less than 6° C (42° F), or if the wing fuel temperature is below 0 °C (32 degrees F); and

1. There is visible moisture (rain, drizzle, sleet, snow, fog, etc.) present; or
2. Water is present on the wing; or
3. The difference between the dew point and the outside air temperature is 3°C (5 °F) or less; or
4. The atmospheric conditions have been conducive to frost formation.

– END –

E-52 (SC): CS 23.901(d)(2) Turbine Engine Installation	
APPLICABILITY:	Kodiak 100 / 200
REQUIREMENTS:	CS 23.901(d)(2), CS 23.903(a)(1)
ADVISORY MATERIAL:	--

SPECIAL CONDITION

Supplementary requirement to CS 23.901(d)(2) for clarification of water ingestion and harmonisation with FAR 23.901(d)(2)

Explanation

On August 18, 2015 EASA published on this web site a proposed Special Condition SC-E23.0901-01. During the public consultation phase no comments have been received. Consequently the proposed SC was adopted. Afterwards it has been shown that the intended wording proposed by EASA’s engineering staff has not been addressed correctly.

Beside all technical issues one of the main goals for this SC was to reach a full harmonised rulemaking text between both FAR 23.901(d)(2) and CS 23.901(d)(2).

This is the reason to publish the proposed SC E23.0901-02. This proposed SC shall replace the adopted SC E23.0901-01.

Introductory Note

The following Special Condition has been classified as a new Special Condition and as such shall be subject to public Consultation in accordance with EASA Management Board decision 02/04 dated 30 March 2004, Article 3 (2.) of which states:

“2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency.”

Statement of Issue

The Certification Basis for operation under rain for turbine engine aircraft on CS-23 aircraft present a discrepancy between the turbine engine installation requirement (CS 23.901(d)(2) and the requirement to be demonstrated during turbine engine certification that is called by CS 23.903(a)(1).

CS 23.901(d)(2) states:

(d) Each turbine engine installation must be constructed and arranged to –
…
(2) Provide continued safe operation without a hazardous loss of power or thrust while being operated in rain for at least 3 minutes with the rate of water ingestion being not less than 4% by weight, of the engine induction airflow rate at the maximum installed power or thrust approved for take-off and at flight idle.

CS 23.903(a)(1)states:

(a) Each turbine engine must either –

(1) Comply with CS E-790 and CS E-800, or …

CS E-790 covers Ingestion of Rain and Hail at engine level. For all engines per CS E-790 (a) per sub-paragraph (a)(2) cross refers to CS-E Appendix A that identifies the required Rain and Hail concentrations :

… each Engine is capable of acceptable operation throughout its specified operating envelope when subjected to sudden encounters with the certification standard concentrations of rain and hail as defined in Appendix A to CS-E. Acceptable Engine operation precludes, during any 3-minute continuous period in rain …

CS-E Appendix A figure 1 identifies a 3% Water to air by weight concentration for Rain thus conflicting with the 4% water by weight of CS 23.901(d)(2).

Note: CS E-790(b) is imposing a 4% Water to air by weight concentration for rotorcraft engines only

Justification

In the continuation of some Aerospace Industries Association (AIA) studies started in 1987 identifying the need for 14 CFR part 33 to address more appropriately the water and hail threats, FAA and JAA initiated efforts, around 1989, to harmonize engine requirements, which among the critical items identified, included the Rain and Hail ingestion standards.

In 1992, FAA requested the Aviation Rulemaking Advisory Committee (ARAC) to evaluate the need for new rain and hail ingestion standards. This task, in turn, was assigned to the Engine Harmonization Working Group (EHWG) of the Transport Airplane and Engine Issues Group (TAEIG) which resulted in 1995 for a recommendation to launch a rulemaking task.

As a result of Notice of Proposed Rulemaking. Notice No. 96-12; issued on 02 FEB 96, FAR 33 and FAR 23 evolved (Final Rule Docket No. 28652) on 20 MAR 98. Prior to that rulemaking task, FAR 23.901(d)(2) was referring to the 4% water by weight for Rain:

(2) Provide continued safe operation without a hazardous loss of power or thrust while being operated in rain for at least three minutes with the rate of water ingestion being not less than four percent, by weight, of the engine induction airflow rate at the maximum installed power or thrust approved for takeoff and at flight idle.

It shall be noted that the FAR 23 wording until 1998 is the exact same wording as still existing today on CS-23 (since initial issue).

With the 1998 amendment, the FAR 23.901(d)(2) rule evolved to :

(2) Ensure that the capability of the installed engine to withstand the ingestion of rain, hail, ice, and birds into the engine inlet is not less than the capability established for the engine itself under Sec. 23.903(a)(2).

And did not change since then.

Interestingly, around the same period of time, JAR-E change 10 – 15 Aug 1999 included the outcome of NPA–E–27 which introduced the Rain and Hail engine rule (JAR E-790) as it still exists today in CS-E. The JAR E evolution for Rain and Hail came slightly after the FAR 33.78 evolution (Notice of Proposed Rulemaking. Notice No. 96-12; Issued on 02 FEB 96 and Final Rule Docket No. 28652; Issued on 20 MAR 98) that was revised along the FAR 23 rules still for same issue of Rain / Hail threats. As a result, JAR E.790 and FAR 33.78 were harmonised.

However during implementation of the Rain and Hail requirement for JAR-E, FAR 33 and FAR 23, the installation paragraph JAA 23.901(d)(2) did not evolve. No further evolution took place with CS introduction at initial issue and its further amendments. As a consequence, its 4% water by weight of CS 23.901(d)(2) conflicts with CS 23.903(a)(1) which refers to CS E.790 / CS-E Appendix A and identify a 3% requirements.

Despite thorough research, the reasons for not amending JAR 23.901(d)(2) while updating CS E-790, FAR 33.78 and FAR 23.901(d)(2) are unclear.

There is no technical rationale for having the engine installation (i.e. air inlet) more capable to ingest rain than the engine certified capability.

It shall be noted that the CS-25/CS-27/CS-29, for the same Rain and Hail problematic, despite having different wording and rule layout, did not impose a greater capability for the installation than the engine itself.

It is proposed to issue a Special Condition, as per SC-E23.0901-02, that is inspired from the FAR 23 wording as follows:

Special Condition SC-E23.0901-02, Engine installation (rain conditions)

“Turbine Engine Installation”

Replace CS 23.901(d)(2) for CS-23 Amdt 0 to 4 with :

GENERAL

CS 23.901 Installation

* * * *

(d) Each turbine engine installation must be constructed and arranged to –

* * * *

(2) Ensure that the capability of the installed engine to withstand the ingestion of rain, hail, ice, and birds into the engine inlet is not less than the capability established for the engine itself under CS 23.903(a)(1).

– END –

F-52 (SC): Protection from Effects of HIRF	
APPLICABILITY:	Kodiak 100
REQUIREMENTS:	CS-23.1309; 23.1431(a)
ADVISORY MATERIAL:	INT/POL/23/1, Issue 1, dated 01-Jun-2003

SPECIAL CONDITION

Protection from the Effects of HIRF

The aeroplane electrical and electronic systems, equipment, and installations considered separately and in relation to other systems must be designed and installed so that:

a. Electrical and electronic systems that perform a function, whose failure would prevent the continued safe flight and landing of the aeroplane must be designed and installed so that:

i) Each function is not adversely affected during and after the time the aeroplane is exposed to the HIRF environment I defined in Appendix 1.

ii) Each electrical and electronic system automatically recovers normal operation, in a timely manner, after the aeroplane is exposed to HIRF environment I, as defined in Appendix 1, unless the systems recovery conflicts with other operational or functional requirements of the system; and

iii) Each electrical and electronic system is not adversely affected during and after the time the aeroplane is exposed to HIRF environment II, as described in Appendix 1.

b. Each electrical and electronic system that performs a function whose failure would significantly reduce the capability of the aeroplane or the ability of the flight crew to cope with adverse operating conditions must be designed and installed so the system is not adversely affected when the equipment providing these functions is exposed to equipment HIRF test levels (b)(i),(ii) or (iii) as described in Appendix 1.

c. Each electrical and electronic system that performs a function whose failure would reduce the capability of the aeroplane or the ability of the flight crew to cope with adverse operating conditions, must be designed and installed so that the system is not adversely affected when the equipment providing these functions is exposed to the equipment HIRF test level (c) as described in Appendix 1.

APPENDIX 1 to SC-F23.1309-02

a) HIRF environments:

Table I lists the HIRF Environment I required by SC-F23.1309-02 sub-paragraph (a)(i) & (a)(ii)

Table II lists the HIRF Environment II required by SC-F23.1309-02 sub-paragraph (a) (iii).

b) Test levels for complying with SC-F23.1309-02 sub-paragraph (b):

As a minimum, one of the following sets of equipment test levels shall be used:

1. From 10 kHz to 400 MHz, use conducted susceptibility tests with CW and 1 kHz square wave modulation of depth greater than 90 percent. The conducted susceptibility current shall start at 0.6 mA at 10 kHz, increasing 20 dB per frequency decade to 30 mA at 500 kHz. From 500 kHz to 400 MHz, the conducted susceptibility current shall be 30 mA. From 100 MHz to 400 MHz, use radiated susceptibility tests at 20 V/m peak, with CW and 1 kHz square wave modulation of depth greater than 90 percent. From 400 MHz to 8 GHz, use radiated susceptibility tests at 150 V/m peak with pulse modulation of 0.1 percent duty cycle with 1 kHz pulse repetition frequency. This signal should be switched on and off at a rate of 1 Hz with a duty cycle of 50 percent. Also, from 400 MHz to 8 GHz, use radiated susceptibility tests at 28 V/m peak with 1 kHz square wave modulation of depth greater than 90 percent. This signal should be switched on and off at a rate of 1 Hz with a duty cycle of 50 percent.
2. Or, from 10 kHz to 400 MHz, use conducted susceptibility tests with CW and 1 kHz square wave modulation of depth greater than 90 percent. The conducted susceptibility current shall start at 0.6 mA at 10 kHz, increasing 20 dB per frequency decade to 30 mA at 500 kHz. From 500 kHz to 400 MHz, the conducted susceptibility current shall be 30 mA. From 100 MHz to 400 MHz, use radiated susceptibility tests at 20 V/m peak, with CW and 1 kHz square wave modulation of depth greater than 90 percent. From 400 MHz to 8 GHz, use radiated susceptibility tests at 150 V/m peak with pulse modulation of 4 percent duty cycle with a 1 kHz pulse repetition frequency. This signal should be switched on and off at a rate of 1 Hz with a duty cycle of 50 percent with a duty cycle of 50 percent.
3. Or, the test level to be used during equipment testing may be based on the HIRF Environment II in with allowance made for aircraft attenuation using aircraft transfer function/attenuation curves. Testing must cover the frequency band of 10 kHz to 8 GHz.

c) Test levels for complying with SC-F23.1309-02 sub-paragraph (c)

As a minimum, the following equipment test level shall be used:

From 10 kHz to 400 MHz, use conducted susceptibility tests, starting at 0.15 mA at 10 kHz, increasing 20 dB per frequency decade to 7.5 mA at 500 kHz. From 500 kHz to 400 MHz, use conducted susceptibility tests at 7.5 mA. From 100 MHz to 8 GHz, use radiated susceptibility tests at 5 V/m

d) Test procedures

AC/AMJ 20.1317 Final Draft Issue (EEHWG Document WG-327 dated November 1998) and EUROCAE ED-14D/RTCA Document DO-160D, Section 20 should be referred to for the applicability of tests and test details.

TABLE I

HIRF ENVIRONMENT I

FREQUENCY FIELD STRENGTH (V/m)

FREQUENCY	FIELD STRENGTH (V/m)	
	PEAK	AVERAGE
10 kHz - 100 kHz	50	50
100 kHz - 500 kHz	50	50
500 kHz - 2 MHz	50	50
2 MHz - 30 MHz	100	100
30 MHz - 70 MHz	50	50
70 MHz - 100 MHz	50	50
100 MHz - 200 MHz	100	100
200 MHz - 400 MHz	100	100
400 MHz - 700 MHz	700	50
700 MHz - 1 GHz	700	100
1 GHz - 2 GHz	2000	200
2 GHz - 4 GHz	3000	200
4 GHz - 6 GHz	3000	200
6 GHz - 8 GHz	1000	200
8 GHz - 12 GHz	3000	300
12 GHz - 18 GHz	2000	200
18 GHz - 40 GHz	600	200

TABLE II

HIRF ENVIRONMENT II

FREQUENCY FIELD STRENGTH (V/m)

FREQUENCY	FIELD STRENGTH (V/m)	
	PEAK	AVERAGE
10 kHz - 100 kHz	20	20
100 kHz - 500 kHz	20	20
500 kHz - 2 MHz	30	30
2 MHz - 30 MHz	100	100
30 MHz - 70 MHz	10	10
70 MHz - 100 MHz	10	10
100 MHz - 200 MHz	30	10
200 MHz - 400 MHz	10	10
400 MHz - 700 MHz	700	40
700 MHz - 1 GHz	700	40
1 GHz - 2 GHz	1300	160
2 GHz - 4 GHz	3000	120
4 GHz - 6 GHz	3000	160
6 GHz - 8 GHz	400	170
8 GHz - 12 GHz	1230	230
12 GHz - 18 GHz	730	190
18 GHz - 40 GHz	600	150

– END –

F-54 (SC): Protection from the Effects of Lightning Strike, Indirect Effects	
APPLICABILITY:	Kodiak 100
REQUIREMENTS:	CS 23.867; 23.954, 23.1309
ADVISORY MATERIAL:	EUROCAE ED-81, amendment 1, dated 26-Aug-1999 EUROCAE ED-84, amendment 1, dated 06-Sep-1999 EUROCAE ED-91, amendment 1, dated 06-Sep-1999 INT/POL/23/3 issue 1, dated 01-Oct-2003

SPECIAL CONDITION

CS-23 Lightning Protection from the indirect effects of lightning strike

Aircraft electrical and electronic systems, equipment, and installations considered separately and in relation to other systems must be designed and installed according to the following :

(a) Each function, the failure of which would prevent the continued safe flight and landing of the aircraft

(i) Must not be adversely affected during and after exposure of the aircraft to the lightning environment; and

(ii) Each affected system that performs such a function must automatically recover normal operation following aircraft exposure to the lightning environment unless this conflicts with other operational or functional requirements of that system.

(b) Each system that performs a function, the failure of which would cause large reductions in the capability of the aircraft or the ability of the crew to cope with adverse operational conditions, may not be damaged and must be recoverable in a timely manner after exposure to the lightning environment.

(c) Each system that performs a function, the failure of which would reduce the capability of the aircraft or the ability of the crew to cope with adverse operation conditions, may not be damaged and must be recoverable in a timely manner after exposure to the lightning environment.

ANNEX

Appendix 1 **Interpretative Material to SC-F23.1309-03**

Interpretative material

to SC-F23.1309-03

For compliance with the above special condition, the following Interpretative Material and Acceptable Means of Compliance shall be used:

* Environment and test waveforms defined in EUROCAE document ED-84 (Aircraft Lightning Environment and Related Test Waveforms) or equivalent SAE ARP5412.
* Lightning zoning as defined in EUROCAE document ED-91 (Aircraft Lightning Zoning) or equivalent Standard SAE ARP5414.
* Acceptable Means of Compliance as defined in EUROCAE document ED-81 (Certification of Aircraft Electrical/Electronic Systems for the Indirect Effects of Lightning) or equivalent standard SAE ARP5413.This document will eventually be replaced by a new AC/AMJ 20-136A.

– END –

Acronyms and Abbreviations

TCDS	Type Certificate Data Sheet
SC	Special Condition
DEV	Deviation
ESF	Equivalent Safety Finding

– END –