Certification Memorandum: Criteria for the determination of the EASA level of involvement in product certification

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Regulatory requirement(s): 21.A.15 (b)(5) and (6), 21.A.93 (b)(3)(ii) and (iii), 21.A.113 (b), 21.B.100(a), 21.B.103 (a)(2), 21.B.107 (a)(2), 21.B.111 (a)(2) and 21.B.453 (a)(3)

About Certification Memoranda

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EASA Certification Memoranda are living documents into which either additional criteria or additional issues can be incorporated as soon as a need is identified by EASA.

Log of issues

Issue	Issue date	Change description
01	02.07.2019	First issue
02	20.09.2019	Second issue. Deletion of contents transposed in the AMC 21.B.100(a) and 21.A.15(b)(6)
03	04.06.2024	Third issue. Revised section 3.3. Split attachment 6 in 6a for avionics systems (unchanged from issue 2) and 6b for cybersecurity (new). Updated abbreviations in attachment 21.

Table of Content

1. Purpose

The purpose of this Certification Memorandum is to complement AMC 21.B.100(a) and 21.A.15(b)(6) with additional guidance and examples.

2. Background

AMC 21.B.100(a) and 21.A.15(b)(6) provide generic acceptable means of compliance. To complement this and in order to support the application of the new concept of proposing and determining the EASA involvement, additional information and panel specific guidance and examples have been established by EASA.

3. Guidance on the application of AMC 21.B.100(a) and 21.A.15(b)(6)

3.1 Determination of LoI

Due to the nature of EASA's work, each technical discipline may progress through the phases of the certification project at a different pace. If this is the case, EASA will determine and notify the LoI partially, as soon as reasonably possible.

3.2 Update of LoI

The applicant shall update the certification programme as necessary during the certification process and report to EASA any difficulty or event encountered during the compliance demonstration process that may have an appreciable effect on the LoI previously notified to the applicant. In this case or when EASA has other information affecting the assumptions of the LoI, EASA will revisit its LoI determination. In this context, and considering that especially during large certification projects, several changes occur (e.g. problems encountered during certification, unforeseen features/developments, further developed insight, changed planning, etc.) which change the LoI, it is essential that a smooth process between the applicant and EASA is ensured. EASA and the applicant – in mutual trust – should ensure that the project is not delayed because of the need to determine the LoI.

3.3 Additional panel specific guidance

Panel specific guidance and examples on the assessment of the criteria of novelty, complexity and criticality, as well as specific aspects related to the involvement per risk class can be found in the attachments 1- 19 to this CM.
Many disciplines are transversal and should not be considered in isolation (e.g. flight test, crashworthiness, electromagnetic compatibility, cybersecurity, development assurance, software, safety assessment, OSD-MMEL, etc.). The LOI proposal should be therefore not limited to the specific panel member of the discipline if it affects also other panels/disciplines.

3.4. Risk matrix

An alternative display of the risk matrices used in AMC 21.B.100 (a) is available in attachment 20 to this CM.

3.5 Accessibility of data and information which are not identified as retained under LoI

According to Part 21 – irrespective of the level of involvement – EASA has the right review any data and information related to compliance demonstration.

4. Remarks

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Attachment 1 - Additional Guidance for the Flight Panel and Human Factors

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Flight Panel.

A.2 Applicability /Disciplines

This attachment applies to the following disciplines within the Flight Panel:

— Flight Test (for all relevant CS Subparts),
— Handling Qualities,
— Performance,
— Flight Manual,
— Human factors, and
— The Human Machine Interface and Cockpit integration.

B. Specific Definitions

None.

C. Specific aspects of novelty

None.

D. Specific aspects of complexity

Any scenario-based compliance demonstration that originates from the Human Factors related design process (see G.3) is considered to be a complex demonstration.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The criticality classification used for system failures is not well-adapted to the Flight Panel disciplines. In the areas of handling qualities and minimum performance, the criticality of an unidentified non-compliance may be classified as being critical if it could be related to the airworthiness requirements of the certification basis, or to a non-adherence to an agreed AMC.

A non-compliance is judged to be critical and, therefore, the CDI should also be classified critical, in particular but not only, if one or more of the following conditions are met:

(i) The part of the change covered by the CDI establishes or affects the aircraft performance;
(ii) The part of the change covered by the CDI establishes or alters the aircraft's flight envelope;
(iii) The part of the change covered by the CDI establishes or alters the handling qualities of the aircraft including the flight control functions (e.g., functional performance of the flight control laws, gains) or the flight protection or flight crew alerting system;

If at the time of proposing or determining the LoI, the above conditions are not certain, and if the applicant still needs to carry out specific compliance demonstration activities in order to verify whether these conditions are met, the CDI shall be classified as 'critical'.

G. Specific aspects related to the involvement per risk class

The Flight Panel will address the specific activities that are necessary to establish the compliance of a specific CDI. The following are the main activities of the flight Panel:

G.1 Activities related to requirements of a subjective nature

Within the Certification Specifications, several airworthiness provisions in Subpart B (and also within other Subparts) require pilot judgment, qualitative assessment or other means of a subjective nature to establish compliance. This may be obvious where the Certification Specifications or the associated AMC explicitly use terms like 'subjective', qualitative', 'piloting skill, 'pilot assessment', 'expertise' or 'suitable' respectively 'unsuitable' to name a few commonly used terms. This subsequently makes this kind of compliance demonstration different from other types of tests for which the evidence could be provided primarily through measurement devices of any kind.

Therefore, a complementary opinion is necessary, and will be provided by the Flight Panel, when dealing with Certification Specifications of a subjective nature.

G.2 Activities related to the determination of the aircraft performance

The activities related to the determination of the aircraft performance are flight testing, agreement on methods and means of performance data reduction and performance data expansion for FM. The performance-related constraints in flight operations can be established from the performance of the aircraft. This is achieved in order to fulfil the minimum safety standards that are required in the appropriate CS.

G.3 Activities related to the Human Machine Interface and the Human Factors related design process and tests

The design of the HMI and the Human Factors design compliance process in accordance with CS 25.1302 (and the similar equivalent Human Factors standard) is an iterative process. Potential Human Factors issues should be identified early in the project, and this requires the early involvement of EASA to follow this process. The process is supported by various types of evaluations

and tests. In general, in the Human Factors domain, there are two complementary types of assessments:

— HMI evaluation: This is an in-depth technical familiarisation also known as the 'conventional approach'. This exercise consists of a systematic exploration of the human-machine interfaces. It allows the early identification of potential design issues, and usually takes place during the early stages of the certification process.
— HF evaluation: This approach is not systematic, and is aimed at evaluating a set of pre-identified potential Human Factors issues. It requires an operationally representative context (simulator or flight test article) and uses a scenario-based approach.

G.4 Scope of Activity

Based on the above activities and considering the established risk class, the Flight Panel will carry out activities with the scope shown in the following table:

SCOPE OF ACTIVITY				
Risk class	Main Flight Panel Activities			
	HQ assessment	Performance determination	HMI evaluation	HF evaluation
class 1	None	None	None	None
class 2	Note 1	Note 1	None	Note 6
class 3	Note 2	Note 2	Note 4	Note 7
class 4	Note 3	Note 3	Note 5	Note 8

NOTES:

1. Flight test participation for Handling Qualities and Performance, risk class 2.
The Flight Panel will have a minimum level of participation in flight testing or witnessing. This means that an EASA crew, with one FTP and/or one FTE, will carry out only an agreed small number of the test points mentioned in the CFTP in order to be satisfied with the compliance verification and retain the minimum level of familiarity with the product. The subset of tests with Flight Panel involvement should include the flight test campaigns (e.g. hot/high trials, cold weather trials, icing campaign), the most sizing test points and a minimum number of familiarization test points in order to carry out the most sizing test points safely. In addition, the essential test plans will be reviewed (e.g. the CFTP, CSTP), as well as an adequate presentation of the test results if required.

2. Flight test participation for Handling Qualities and Performance, risk class 3.
The Flight Panel will have a reduced/medium level of participation in flight testing or witnessing. This means that an EASA crew, with one FTP and/or one FTE, will carry out an agreed subset of the test points mentioned in the CFTP in order to be satisfied with the compliance verification, achieve adequate substantiation, and retain an adequate appreciation of the ongoing certification activity and the aircraft. The Flight Panel should be involved in an adequate subset

of the test point matrix, including the flight test campaigns (e.g. hot/high trials, cold weather trials, icing campaign) and the most sizing test points. In addition, essential test plans will be reviewed (e.g. the CFTP, CSTP) as well as an agreed subset of reports or presentations to show test results.

3. Flight test participation for Handling Qualities and Performance, risk class 4.
   The Flight Panel will have a high level of participation in flight testing or witnessing. This means that an EASA crew, with one FTP and/or one FTE, will carry out a large number of test points mentioned in the CFTP in order to be satisfied with the compliance verification, achieve and retain a broad appreciation of the ongoing certification activity and the aircraft. In addition, the essential test plans will be reviewed (e.g. the CFTP, CSTP) as well as an agreed large number of reports or presentations to show the test results.

4. HMI evaluation, risk class 3.
   The Flight Panel will assess the HMI while carrying out other activities within the determined risk class. In addition, an adequate presentation of the evaluation results may be required.

5. HMI evaluation, risk class 4.
   The Flight Panel will carry out specific activities to assess the compliance of the HMI. In addition, an appropriate report or presentation on the test results will be reviewed, and the final document summarizing the successful completion of all the activities as per certification programme may be reviewed.

6. HF evaluation, risk class 2.
   The Flight Panel will typically review and agree with the proposed level of scrutiny and associated means of compliance, which depend on the agreed level of novelty, complexity and integration. In addition, an adequate presentation of the test results may be required.

7. HF evaluation, risk class 3.
   The Flight Panel will typically review and agree with the proposed level of scrutiny and the associated means of compliance. The Flight Panel will participate in a selected number of HF flights and simulator evaluations. In addition, key compliance data may be reviewed (e.g. test orders and adequate documents/presentations to show the test results, and the final document summarizing the successful completion of all the activities as per the certification programme).

8. HF evaluation, risk class 4.
   The Flight Panel will participate in all the activities necessary to establish HF compliance.

9. Flight Panel will usually not participate in any non-regression tests. Non-regression tests are tests performed to show that a design change introduced in a given area does not produce negative impacts in any other area. Such tests are part of the certification programme of the change.

Attachment 2 - Additional guidance for OSD - Flight Crew

A. Purpose and scope

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the OSD - Flight Crew.

A.2 Scope

This attachment applies to the following operational evaluation activities within the OSD - Flight Crew Panel:

— Identification of a pilot type rating (e.g. new type or variant; high-performance aeroplane designation, license endorsement, experience requirements and prerequisites; validity of type/class rating; recent experience and currency requirements);
— Determination of an aircraft type specific pilot training, checking and currency requirements (e.g. content of training syllabus; training footprint; identification of TASE; checking requirements; instructor requirements);
— Commonality between aircraft (e.g. credits between aircraft types or variants; experience and currency requirements for mixed-fleet flying, etc.);
— Provisions for a specific type of operations or specific aircraft missions (e.g. LVO, HEMS), in a specific environmental context (e.g. Steep Approach, RVSM), or for optional equipment (e.g. ECL, HUD/SVS); and
— Any other flight crew operational evaluation activity.

B. Specific Definitions

Handling characteristics	The manner in which the aircraft responds with respect to the rate and magnitude of pilot-initiated control inputs to the primary flight control surfaces.
Recent experience	The recent experience described in Part-FCL.060.
Training Areas of Special Emphasis (TASE)	The specific knowledge and skills required for the safe operation of an aircraft, use of equipment, application of procedures or performance of operations.
Training footprint	A summary description of a training programme, usually in short tabular form, showing the training subjects, modules, procedures, manoeuvres or other programme elements which are planned for completion during each day or phase of training.

Variant	An aircraft or a group of aircraft within the same pilot type rating that has differences to the base aircraft requiring difference training or familiarisation training

C. Specific aspects of novelty

The following are examples (non-exhaustive) which may be considered to be novel:

— Tilt rotor aircraft;
— Gyrocopters;
— Electric aeroplanes;
— New aircraft systems and pilot interfaces;
— New avionic features; or
— New flight control systems and logics.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

— the compliance demonstration for requirements of subjective nature may be considered to be a complex demonstration. In particular, T-tests, as described in CS-FCD, are scenario-based compliance demonstrations which comprise pilot performance and checking; or
— Crew workload assessments and highly interrelated multiple systems (and their associated failure modes) may impact the complexity of the compliance demonstration.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The criticality for the OSD-FC domain resides with the correct and complete identification of the aircraft specific OSD - flight crew for the compliance with the provisions laid down in the Aircrew and Air Operations regulations with regard to specific aircraft types and variants, established in order to support end-users (e.g. operators or training organisations).

In terms of the potential safety consequences, incorrect, incomplete, or non-compliant OSD flight crews may lead to inadequate flight crew training, checking or currency at the operator level, and to unsafe operation of the respective aircraft.

G. Specific aspects related to the involvement per risk class

As the Certification Specifications for OSD Flight Crew are ‘process-based’, the compliance demonstration is generally established through an operational evaluation process involving the judgement of the EASA pilot.

The OSD Flight Crew Panel will look at the specific activities that are necessary to establish the compliance of a specific CDI. The following are the main activities:

G.1 Activities related to requirements of a subjective nature

T-tests, as described in CS-FCD, require independent pilot judgment and a qualitative assessment to establish compliance.

This is evident where the requirements in CS-FCD or associated GM refer to 'pilot ability to fly the aircraft', 'the degree of difficulty in performing manoeuvres', 'requirement for pilot skills', 'handling characteristics or performance characteristics perceivable by a pilot', 'proficiency checks', 'adequate' or 'inadequate' pilot training, 'assessment of pilot skills', 'comparison of handling characteristics', or 'administering checking'.

G.2 Scope of activities

Typically, an initial OSD-FC approval, or a major change to the OSD-FC, will always require the involvement of EASA, based on the considerations in G.1, using test subjects and T tests as described in CS-FCD. However, when evaluating a major change to the type certificate for which the related OSD-FC change has been classified as minor based on the guidance for the classification of changes to the OSD, the activities of the OSD Flight Crew Panel may be reduced according to the risk classes. In these cases, the following will apply:

Activities for OSD-FC, risk class 1: No further involvement.

Activities for OSD-FC, risk class 2: the involvement of the OSD Flight Crew Panel is limited to the review of selected OSD FC compliance data.

Activities for OSD-FC, risk class 3: In addition to what is defined for risk class 2, participation in selected compliance activities (test participation or witnessing of T-tests, etc.).

Activities for OSD-FC, risk class 4: In addition to what is defined for risk class 3, the OSD Flight Crew Panel will have a higher level of T-test participation or witnessing.

Attachment 3 - Additional guidance for Structures

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Structures.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Structures Panel:

— Loads (flight, ground, control system, pressurisation, crash, dynamic, static, etc.), Weight and Balance,
— Static strength and proof of structure (analysis, supporting tests, special factors),
— Fatigue and damage tolerance,
— Aeroelasticity, Vibration and Buffeting,
— Crashworthiness,
— Impact conditions (e.g. bird strike),
— Decompression, and
— Materials and manufacturing.

B. Specific Definitions

None.

C. Specific aspects of novelty

In general, within the scope of the structures disciplines (including elements of systems and transmissions), any new/novel/unusual design feature should be addressed that could affect structural performance in any of the following: Loads, Aeroelasticity, Static Strength, Fatigue & Damage Tolerance, Crashworthiness, Decompression, Material & Processes, Impact Conditions (bird strike, rotor burst, wheel & tyre failures....).

The following list (not exhaustive) provides examples which may be considered to be novel for

Design and manufacturing:

— New materials in airframe or equipment, such as new metal alloys or composites;
— New combinations of materials;
— New applications of new materials or combinations of materials (composites ‘tailored’ to designs);
— New manufacturing processes, such as additive manufacturing or laser welding;
— New use of Electronic Flight Control Systems, such as manoeuvre of gust load alleviation systems;

— New engine technologies, such as open rotors (with possible uncontained engine failures);
— New or unusual aircraft configurations, such as canards or blended wing designs;
— Novel airframe layouts or structural configurations outside the applicant's previous experience;
— Unusual location of fuel tanks and/or amounts of fuel carried;
— Structural changes such as passenger to freighter or VIP conversions, large antenna or winglet installations, if not previously performed by the Applicant and certificated by EASA; or
— New inspection techniques associated with damage tolerance evaluation.

Operation:

— New or unusual operations, such as flight at high speed (e.g. supersonic) and/or high altitude (e.g. above 51 000 ft), including sub-orbital aircraft; or
— Changes in operation (e.g. maritime surveillance, steep approach, operation on unpaved runways, towbarless towing, zero-g operation).

Requirements:

— Where a key or sensitive requirement or AMC is invoked that is still not fully accepted/understood, e.g. CS 25.562 with respect to adapter plates; CS 25.365 with respect to small compartments, or ditching MoC. This includes Certification Specifications for which Generic CRIs exist.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

— Increased complexity of structures or systems that include or affect structures,
— Difficulty in establishing and validating boundary conditions used during finite element modelling, in particular for redundantly supported or movable structures,
— Establishing and verifying loads for complex aerodynamic shapes, especially when combined with interactions with movable surfaces or engine efflux,
— Defining appropriate methods of analysis and supporting test programmes for structures and materials with multiple, and possibly interacting, failure modes,
— Accurate analysis and representative testing of hybrid structures,
— Identifying and addressing the location and potential effects of residual stresses,
— Decisions regarding the acceptability of inspection techniques in areas that are difficult to access,
— CDIs that involve dynamic analysis, e.g. impact or dynamic loads,
— Understanding and addressing the link between in-service degradation and critical failure analysis, e.g. free play of control surfaces for flutter,
— Complex decision-making process in classification of structure,
— Interactions of system and structures (CS 25.302 and SCs for other applications), or
— Difficulty in identifying all of the relevant factors in design, manufacture and service that could affect the integrity of critical parts.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The criticality can be identified as being specific to a component or system based on the criticality of the failure of the component or specific to compliance with the requirements.

A general assessment of the criticality for the airframe and structural aspects of systems and transmissions should take into account the following:

— For systems-related aspects, CS 2x.1309 could be used to help identify the critical aspects.
— Transmissions that utilise more generic criteria in some requirements. The rotorcraft critical parts plan can be used to identify the components.
— The classification of structure varies in different organisations, but the criticality can be based on whether a failure of a structural element could lead to a catastrophic event e.g. classification as a primary structural element, fatigue-critical structure or a design detail point according to e.g. CS 25.571. Outside the system safety assessment, no hazardous, major or minor classification exists in the certification requirements for structures. It is recommended that all the structure is assessed for the consequences of its failure to ensure the good design practice that is appropriate to the structures function, and to facilitate the LoI process. For example, primary structure that is not classified as contributing to a catastrophic failure e.g. under 25.571, or structure that is classified as a significant structural item through an MRBR may well have hazardous consequences if it fails.
— Structural elements whose failure could result in injury to occupants, the blocking of evacuation paths, or damage to critical systems.
— Critical parts (CS 27/29.602) are critical by definition.
— Critical castings (CS 2X.621) are critical by definition.

The following high-level technical subjects can be considered to be necessary to facilitate an initial assessment of each part of the design:

— Loads (flight, ground, control system, pressurisation, crash, dynamic, static etc.);
— Static strength and proof of structure (analysis, supporting tests, special factors);
— Fatigue and Damage Tolerance;
— Aeroelasticity;
— Crashworthiness;
— Rapid decompression;
— Impact Conditions (bird strike, rotor burst, wheel & tyre failures …); and
— Materials and manufacturing processes.

For each of these technical subjects, the criticality will be established based upon an assessment of the impact of the design on that aspect, taking into consideration:

— Is a failure of the affected structure potentially catastrophic, or does it pose a risk to the occupants or the critical systems?
— Are the methods and MoC conservative?
— Is there any adverse service experience?

G. Specific aspects related to the involvement per risk class

None.

Attachment 4 - Additional guidance for Hydromechanical Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Flight Controls and Hydromechanical Systems.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Hydromechanical Systems Panel:

— Flight Control Systems [ATA 270 on Aeroplanes / 670 on Rotorcraft];
— High-Lift Systems [ATA 275];
— Hydraulics [ATA 290];
— Landing Gear Systems and Wheels, Tyres & Brakes [ATA 320];
— Fuselage Doors [ATA 520];
— Helicopter Hoist installations; and
— Ram Air Turbine (RAT) Mechanical systems.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides some examples which may be considered to be novel:

— Fly-by-wire technology for rotorcraft and other non-CS 25 applications, fly-by-light;
— Engine-off taxiing;
— Systems actuation by electrical power, including Electrically Actuated Braking Systems (EABSs), Electro-Hydraulic or Hydrostatic Actuators/Electro-Mechanical Actuators (EHAs/EMAs)
— New materials, for example new brake materials;
— New processes (e.g. 3D printing, additive layer manufacturing);
— New Flight Control or Hydromechanical (HM) system architecture compared with previous programmes;
— New functions, e.g. a new means to implement load alleviation in a Flight Control System(FCS), a 'Smart' Autobrake Function, a Runway Overrun Awareness & Avoidance System (ROAAS), a brake pressure ramp-up;
— A change of the MOC, e.g. more use of simulation or similarity compared with previous projects, e.g., Hydraulic systems for which no or minimum tests are planned;
— Increased hydraulic system pressure compared with previous experience (e.g. 5 000 psi);
— Change of the means to cool the hydraulic fluid (e.g. a fuel heat-exchanger);
— New engine types or technologies;

— New wing designs, where there is a risk of interference;
— Novel reconfigurations of systems following failure, e.g. Flight Control Law (FCL) degraded modes;
— Novel pilot interfaces, e.g. active sidesticks, touch screen controls;
— Remotely Piloted Air Systems/ Unmanned Air Vehicles (RPAS / UAVs)
— Flight Envelope protection / Electronic Stability and Protection; or
— Tilt Rotors.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

— Fly-by-wire / Fly-by-light Flight Control Systems;
— Use of active sidesticks for Flight Control Systems;
— Flight Control Laws (closed loop);
— Specific functions in Flight Control Systems (e.g. load alleviation, force fight compensation, oscillation monitoring, input data monitoring, automatic trim, automatic functions in High-Lift Systems, High-Lift Systems asymmetry / skew detection, Brake to Vacate, directional control combined with Nose Wheel Steering/Brakes);
— Electro-Hydraulic Actuators/Electro-Mechanical Actuators (EHAs/EMAs);
— Brake-by-Wire Control Systems;
— Antiskid Controls;
— Autobrake functions;
— Electrically Actuated Braking Systems (EABSs);
— Steer-by-Wire Control Systems;
— Runway Overrun Awareness & Avoidance Systems (ROAASs);
— Thermal management of hydraulic systems; and
— The design of fuselage doors in pressurized areas.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

In general, most of the scope of Panel 4 pertains to aircraft systems, thus a 2x.1309 approach could be used. It should be noted that most of the systems under the responsibility of Panel 4 have further applicable CS provisions (i.e. not only designed to 2x.1309) as they are usually considered to be highly safety-critical. The consequences of a potential non-compliance with the Certification Specifications would be an unsafe condition at the aircraft level. The potential consequences of a non-compliance would be severe for each of the CS provisions that are applicable to any of the following subjects. This list is not exhaustive.

— The criticality of the system (in terms of potential safety consequences of a system failure), which is not always known in the early stages of project, but can often be estimated conservatively;
— Fly-by-wire / Fly-by-light (as opposed to purely mechanical flight controls);
— Brake-by-wire (as opposed to a simple purely hydromechanical brake system);

— Anti-skid brakes (as opposed to a brake system without anti-skid);
— Steering-by-wire (as opposed to purely mechanical steering);
— Towbarless Towing;
— Fuselage Doors which are a hazard if opened in flight, e.g. pressurised doors;
— Indications of doors closed/latched/locked;
— Independence between systems, e.g. normal and alternate Landing Gear extension;
— Evidence of potential single failures and common mode failures/errors for critical functions, e.g., single failures of system clutches and brakes;
— Interactions of systems and structures for critical functions;
— External Loads Primary and Back up Quick Release Systems (PQRSs/BQRSs);
— Prevention of high-lift asymmetry / skew;
— Adverse experience, e.g. Trimmable Horizontal Stabiliser Actuator (THSA), rotorcraft servovalves, air data probes/inputs;
— Autopilots with greater authority;
— Large numbers of rotorcraft critical parts;
— New inputs to the MMEL for critical functions (which could be a reason for a later change to the LoI);
— Changes in the environment or critical operating conditions.

G. Specific aspects related to the involvement per risk class

Class 1
None.

Class 2

The involvement may comprise

— the review of the SFHA and a limited number of test plans/reports and/or analysis; or
— information that summarises the main results of the compliance demonstration and AFM(S).

The expected number of certification meetings is likely to be limited, and there should be no or very limited witnessing of tests or inspections.

Class 3

In addition to what is defined for risk class 2, the involvement may comprise:

— The review of some key compliance data such as:
  - The AFHA / (P)ASA / (P)SSA,
  - Important analyses (PRA, ZSA, …), or
  - Important test plans and reports.
— The witnessing of a few selected tests;
— The inspection of a few selected aircraft systems; and
— Audits on the development assurance process may be conducted at one or two stages of the process.

Class 4

In addition to what is defined for risk class 3, the involvement comprises:

— The review of more compliance data;
— The witnessing of most certification tests;
— The inspection of selected aircraft systems; and
— Audits on the development assurance process may be conducted at more stages of the process.

Attachment 5 - Additional guidance for Electrical Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Electrical Systems.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Electrical Systems Panel.

— Electrical Generation / Distribution;
— EMC;
— HIRF and Lightning Indirect Effects;
— Lightning Direct Effects;
— EWIS;
— Lights;
— IFE / Power outlets (for passengers or crew); and
— Wireless transmission capabilities (for passengers or crew).

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples per discipline which may be considered to be novel:

Electrical Generation / Distribution

— New materials in equipment (e.g. lithium batteries),
— New combinations of materials,
— New electrical system architectures compared with previous programmes,
— New functions,
— Novel electrical system configurations outside of applicant's previous experience,
— Increased electrical system voltages compared with previous systems,
— New engine types or technologies (new electrical generation principle), or
— New types of circuit breakers (e.g. Arc Fault Circuit Breakers).

EMC

— New standards used for EMC,
— New materials used with less protective characteristics, or
— More extensive use of numerical models for compliance demonstration instead of testing.

HIRF and Lightning Indirect Effects

— New materials used with less protective characteristics, or
— More extensive use of numerical models for compliance demonstration instead of testing.

Lightning Direct Effects

— The use of new materials for the fuselage or its parts with less protective characteristics towards lightning direct effects,
— The use of new materials for the fuel tanks or their parts, with less protective characteristics towards lightning direct effects, or
— More extensive use of numerical models for compliance demonstration instead of testing.

EWIS

— Subpart H, specifically for new TC applications, or
— New technology used for EWIS components.

Lights

— New technology for the power supply of emergency lights, e.g. batteries with new chemicals, or
— New types of light-emitting technology.

Wireless transmission capabilities (for passengers or crew)

— PED tolerance demonstration.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

Electrical Generation / Distribution

— A fly-by-wire flight control system that requires a continuous source of electrical power in order to keep the flight control system operable,
— The use of composite materials in the aircraft structure that could require a specific network to ensure the classical electrical functions provided by the structure (notably: return path for functional electrical currents and fault currents, voltage reference points, etc.), or
— Distribution through complex management systems, possibly involving software.

EMC

— The integration of different functions with different levels of safety impact in one system.

HIRF and Lightning Indirect Effects

— The integration of different functions with different levels of safety impact in one system.

Lightning Direct Effects

— The use of composite materials in fuel tanks that could require particular considerations for the protection of the fuel system in relation to the ignition risk due to a lightning strike on the structure or the accumulation of electrical charge, or

— The integration of different functions with different levels of safety impact in one system.

EWIS

— The monitoring of electronic circuit breakers in centralised systems, or

— The introduction of systems in EWIS zones that could negatively affect the EWIS components, e.g. the introduction of hydraulic lines, fuel lines, water, oxygen, etc.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The level of criticality is also critical when a failure related to the EWIS can result in hazardous or catastrophic effects at the aircraft level, as addressed in CS 25.1709 and AMC. 25.1709.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1: None.

Class 2: The involvement of the EASA experts on the project may comprise:

— the review of information that summarises the main results of the compliance demonstration, and the AFM(S), and

— the review of a small number of compliance data elements, which may comprise the

- SFHA,
- Electrical Load Analysis, and the
- EMI Test Plan.

Other specific data items may be requested. The number of certification meetings is likely to be limited, and there should be no witnessing of tests, or inspections.

Class 3: In addition to the involvement stated above for risk class 2, the involvement of the EASA experts comprises:

— the review of key compliance data such as:
  - the AFHA / (P)ASA / (P)SSA (2x.1309 and 25.1709),
  - Important analyses (PRA, ZSA, …),
  - Important test plans and reports, and
  - The EWIS design and separation rules.
— The witnessing of a few selected tests and inspections, and
— Audits on the development assurance process may be conducted at one or two stages of the process.

Class 4: Compared with risk class 3, the involvement for risk class 4 is increased in terms of:

— The review of a significantly larger amount of data produced by the applicant for demonstrating compliance; for instance, design data items which the main compliance data refer to, and which contain a greater level of detail; and
— Deeper involvement in the witnessing of certification tests and agreement on the interpretation of test results.

Attachment 6a - Additional guidance for Avionics Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Avionics Systems.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Avionics Systems Panel:

— Autoflight systems (includes auto-pilot, auto-throttle, flight guidance, flight envelope, stability, etc.),
— Communications & Navigation & Surveillance (includes air data systems, datalink, transponder, radio, environment surveillance systems (TCAS, TAWS, Weather Radar …), etc.
— Flight management systems,
— Indicating, Alerting & Recording systems and Diagnostic and Maintenance systems (includes display systems, instrument and control panels, recorders, vibration/vehicle monitoring systems, general computers, central warning systems, maintenance systems, etc.),
— Integrated Modular Avionics (includes IMA resources, databuses)

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

— New technology or functionality:
  - Synthetic Vision Systems (SVS) on a Head Up Display,
  - Integrated Modular Avionics (IMA) Systems,
  - Touchscreens, and
  - Wireless interfaces.

— New types of operations (or ones that are novel for the applicant):
  - Expansion towards an operational capability of the aeroplanes which is novel for the applicant,
  - Expansion towards an operational capability concept which is new to the applicant or EASA, or
  - Expansion towards VFR night or IFR operations for aeroplanes that are only approved for VFR day operations (e.g. aeroplanes certified according to CS-LSA or CS-VLA).

— New Requirements:

- CS-ACNS, or
- CS 25.1322 Amendment 11, Flight Crew Alerting.

— New means of compliance:
- AMC 25-11 for Head-Up and Weather Displays, or
- AMC 25.1322 Flight Crew Alerting.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

— Complex designs:
- Integrated Modular Avionics (IMA) Systems, or
- The installation of an Avionics Suite.

— Complex compliance demonstration/interfaces to other technical disciplines or CDIs and requirements:
- Reduced Vertical Separation Minimum (RVSM),
- Required Navigation Performance Authorization Required (RNP-AR),
- Enhanced Vision Systems (EVS), or
- All-weather Operations.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

None.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1
None.

Class 2

The involvement of the EASA experts on the project may comprise:

— the review of information that summarises the main results of the compliance demonstration, and the AFM(S), and
— the review of a small amount of compliance data (e.g. SFHA, compliance demonstration with CRIs or AMCs and other important compliance demonstrations).

The expected number of certification meetings is likely to be limited, and there should be no witnessing of tests, or inspections.

Class 3

In addition to the activities stated above for risk class 2, the involvement of the EASA experts may comprise:

— the review of key certification data such as:
  - the AFHA / (P)ASA / (P)SSA,
  - Important analyses (PRA, ZSA, …), or
  - Important test plans and reports.
— The witnessing of a few selected tests and inspections may be performed, and
— Audits on the development assurance process may be conducted at one or two stages of the process.

Class 4

— In addition to the activities stated above for risk class 3, the involvement of the EASA experts comprises the potential review of more compliance data,
— The witnessing of a large number of ground, simulator and/or bench certification tests, and/or inspections may be performed, and
— Audits on the development assurance process may be conducted at potentially all stages of the process.

NOTE:
The Avionics Panel considers Open Problem Reports (OPRs) to be deviations from the requirements. The assessment of the impact of OPRs may result in a change in the LoI.

Attachment 6b - Additional guidance for Cybersecurity

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Cybersecurity.

A.2 Applicability / Disciplines

Cybersecurity specific guidance and examples on the assessment of the criteria of novelty, complexity and criticality, as well as specific aspects related to the involvement per risk class can be found in this attachment 6b of this CM.
This attachment applies to any function, component or system for which there is a potential effect on safety as a result of a cybersecurity threat.
Intentional Unauthorized Electronic Interaction (IUEI) can occur on several systems and are not limited to avionics systems. Limiting the assessment to avionics systems may result in overlooking attack paths (e.g., engine controller operational software data load through maintenance laptop). Those attack paths if exploited may trigger unsafe condition. Cybersecurity is therefore transversal to several disciplines. For organisational reasons, the LOI for cybersecurity is defined in Attachment 6b, which while associated with Attachment 6a(dedicated to avionics systems), the applicant should not limit their assessment to avionics systems when assessing the LOI for cybersecurity at the aircraft, system and equipment levels.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

- New means to upload software or operational information (e.g., executable code and data, database, flight plan)
- Connectivity methods that are new to either the industry as a whole, or to the applicant, including their subcontractors, or from an EASA panel perspective
- Use of existing connectivity methods with a standard not currently used in aviation domain.
- Addition of security measures (e.g., addition of a new signature checker, addition of an application proxy)
- New requirements for a given aircraft type or product (respective Certification Specification amendment not in the certification basis yet): CS 2X.1319 /GM

23.2500(b)/CS-APU 90(d)/CS-E 50/CS-P.230 or corresponding cybersecurity special condition
- For a given aircraft type or product, first use of AMC 20-42 or first use of acceptable means recommended in AMC 20-42
- Alternative means and methods of demonstrating compliance (e.g., other than AMC 20-42).
- Increase or decrease of Security Assurance activities as compared to activities that were performed by an applicant for a previous certification project.

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:
- Introduction of a complex worksharing scheme with system / equipment suppliers (e.g. high reliance on system suppliers to undertake the risk assessment, or as the originator of critical security measures)
- Use of artificial intelligence in the security measures
- Complex encryption methods (e.g., post-quantum cryptography)

E. Specific aspects of the performance of the Design Organisation

With no or limited past experience, the use of avionics DOA performance rating may not be applicable and a lower rating may apply for the cybersecurity discipline.

F. Specific aspects of criticality

The installation or activation of, or a change to, a function, component or system should be considered critical if it is a subject to an intentional unauthorized electronic interaction (IUEI) and it may contribute to a condition that has an adverse effect on the safety at the aircraft level
The term ‘adverse effects on the safety at the aircraft level’ should be understood in the context of information security as major, hazardous, or catastrophic for CS-25 and CS-23 Level 4 aircraft and hazardous or catastrophic for any other aircraft type.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA’s involvement per risk class:

Class 1
None.

Class 2
The involvement of the EASA experts on the project may comprise:
- Plan for Security Aspects of Certification (PSecAC)
- Aircraft and System Security Scope Definition (ASSD/SSSD)
- Aircraft and System Security Risk Assessments (ASRA/SSRA)
- Aircraft and System Security Verification (ASV, SSV)

- Aircraft Security Operator Guidance (ASOG)
- System Security Integrator Guidance (SSIG)
- The information that summarises the main results of the compliance demonstration related to cybersecurity activities: such as PSecAC Summary and Security Report (including the residual open issues or identified deviations).

Cybersecurity audits on the whole security process at the aircraft and system level may be conducted at one stage of the process.

Class 3

In addition to the activities described for risk class 2, the involvement comprises the assessment of additional key activities and compliance data elements such as the:

- Aircraft and System Security Architecture and Measures (ASAM, SSAM)

Any other specific data items, which support the review and acceptance of the above referenced data, may be additionally requested.

Cybersecurity audits on the whole security process at the aircraft and system level may be conducted at one or two stages of the process.

Witnessing of the refutation/penetration testing may be conducted.

Class 4

The involvement of the Cybersecurity experts comprises, but is not limited to, the activities described for risk class 3.

Cybersecurity audits on the security process at the aircraft level and system level may be conducted at every stage of the process, which may include an extended list of systems/security measures.

Witnessing of the refutation/penetration testing may be conducted.

Attachment 7 - Additional guidance for the Powerplant Installation and Fuel Systems Panel

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Powerplant installation and Fuel Systems panel.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Powerplant installation and Fuel Systems Panel:

— Engines, propellers and APU installations,
— Fuel systems,
— Fuel tank inerting,
— ETOPS / EDTO,
— Fire protection (unpressurised areas), and
— Volcanic Ash.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

Design:

— The introduction of a new fire threat (new fuel, hydrogen, high-energy storage devices, batteries in Designated Fire Zones),
— New fire detection concepts,
— Halon-free fire extinguishing products,
— New fire prevention principles,
— New fire protection materials and principles,
— New energy supplies (e.g. new fuels, hydrogen, electric …),
— The unusual location or construction of fuel tanks,
— Novelties that affect the fuel tank safety precautions and concepts (all-composite fuel tank, explosion-withstanding capability),
— The unusual location of engines/APUs/Propellers,
— The first introduction by the applicant of a multi-engine configuration,
— The first introduction by the applicant of a turbine engine,
— The first introduction by the applicant of an electronically controlled engine,

— Aspects identified in the Propeller unit, APU unit or Engine unit that affect the Propeller/APU/Engine installation rules at the aircraft level (open rotors, electrical engines, hybrid engines, complex engine lubricating systems, new engine materials, aircraft functions implemented on or shared with engines/APUs/Propellers, new engine fuel filtering concepts…),
— New propulsion thrust/power/torque ratings,
— New engine/propeller/APU threats and failure modes,
— New propulsion thrust/power/torque generation and management concepts (including multi-engine logic, vectored thrust, use of thrust reversers in-flight, …),
— Temporary use of propulsion thrust/power/torque generation,
— Tilt Rotors, or
— UAVs.

Operation:

— Volcanic ash,
— High altitude and/or high speed operations (supersonic flight, suborbital flight), or
— Changes in operation (e.g. aerobatics, maritime surveillance, steep approaches, operation on unpaved runways, zero-g operations, oil dispersing).

Requirements:

— Whether a key or sensitive requirement or AMC is invoked that is still not fully accepted/understood or had been controversial, e.g. Cowling latches, APU door compliance, 2D Nacelle areas, fire size assumptions. This includes the Certification Specifications for which Generic CRIs exist; or
— New Icing Environments defined in CS-25 Appendix O (Super Large Droplets) and Appendix P (glaciated conditions).

Compliance Demonstration

— New Propeller/APU/Engine certification assumptions that are not in line with the aircraft certification assumptions,
— Aircraft systems/parts/equipment certified with the engines/APU/Propellers,
— Fuel tank crashworthiness (CS 27.952/CS29.952) demonstrated by analysis and/or partial drop test,
— Credit for containment capability assumptions (UERF for APU/Engine)), or
— Use of simulation tools (for fire, thermal, water ingestion, or icing).

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

Design:

— Transition from a single engine to a multi-engine configuration,
— Transition from a reciprocating engine to a turbine engine,
— Transition from a mechanically controlled engine to an electronically controlled engine,

— Thrust/power/torque control functions (autothrust, autothrottle, remote control, Thrust Control Malfunction function),
— Engine/APU/Propeller interfaces with the aircraft that include multi-engine logic,
— In-flight BETA/ reverse thrust prevention functions,
— Aircraft functions embedded into engine components, or
— The use of composite materials.

Compliance demonstration:

— Difficulty in the definition of test specimens:
  - Examples for which the definition of the test specimen is difficult in Subpart E: the fuel tank crashworthiness specimen may require separate testing, analysis, or simulation to determine the necessary surrounding structure of the fuel tank.
— Compliance demonstration by flight test for in-flight restart or cooling or engine electronic control fault evaluation;
— Compliance demonstration by analysis replacing required tests:
  - Where compliance demonstration is traditionally done by test and would be proposed by an alternate Means of Compliance (similarity and/or past testing data reconciliation is out of the scope).
— Fire size characterization and the interpretation of fire test results;
— Fuel tank crashworthiness;
— Compliance demonstration of fuel tank flammability and ignition prevention:
— Compliance demonstration by simulation:
  - Some examples for which simulation is complex: prediction of the concentration of fire extinguishing agents in multiphase flow in a ventilated designated fire zone with a multitude of equipment, structure and harnesses, the prediction of the fire size, intensity and behaviour including the participation in burning of the materials/components in a closed volume or in an open volume, the prediction of ignition of flammable vapours for hot surfaces, or the prediction of leaks in fuel tanks for dynamic crash conditions.

Interfaces:

— Demonstration of the validity of Engine/APU/Propeller certification data for re-use in aircraft compliance;
— Fire risks (multi ATA chapter implications);
— UERF for APU/Engine/Propeller debris release compliance demonstration (multi ATA chapter implications);
— Sustained Engine Imbalance (SEI) (multi ATA chapter implications);
— ETOPS (multi ATA chapter implications, use of engine data). The complexity is dependent on a combination of factors, such as (but not limited to): the applicant's experience with the ETOPS methodology, the applicant's fleet ETOPS experience, the ETOPS certification of the engine, the acceptable means of compliance for the combination of engine design changes/aircraft design changes for which the applicant is seeking ETOPS approval, the assessment of contributions from similarities with earlier certified ETOPS engine/aircraft combinations; or
— Volcanic Ash (multi ATA chapter implications, the use of engine data).

Requirements:

— The applicability of Fuel Tank Safety Rules (CS 25.981).

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

In general, the scope of Panel 7 either follows a 2x.1309 or a Particular Risk Analysis (PRA) approach. PRAs have specific safety objectives. The items below may be classified as being critical:

— Fire risks,
— Fuel tank overpressure / explosions,
— Fuel quantity and leak management,
— The ability to maintain the aircraft attitude (e.g. fuel balancing),
— Fuel release overboard and fuel tank crashworthiness,
— Protection of occupants (e.g. crashworthiness, wheels up landing)
— Independence between the engines and the engine fuel supply,
— Common causes that affect the propulsion of the aircraft (e.g. icing, fuel contamination, software/hardware development, …),
— The release of debris (APU, Engines and Propellers),
— Loss of thrust/power/torque,
— Thrust/torque/propeller control malfunctions,
— Inadvertent reverse thrust/Beta mode,
— The opening of engine/nacelle cowls, or APU doors in flight,
— The detachment of an engine/nacelle/APU/propeller,
— The ability to conduct safe flight and landing under SEI, UERF, Propeller debris release, or
— Evidence of potential single failures and common mode failures/errors for critical functions, e.g., single failures for the accommodation of thrust control malfunctions, single failures that lead to fuel tank explosions, single failure and latent failure contributions to in-flight thrust reverser deployment.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1
None.

Class 2

The involvement typically may comprise the review of:

— The SFHA and a limited number of test plans/reports and/or analysis;

— The information summarising the main results of the compliance demonstration and the AFM(S);

The expected number of certification meetings is likely to be limited and there should be no or very limited witnessing of tests, or inspections.

Class 3

In addition to what is defined for risk class 2, the involvement may comprise:

— The review of some key compliance data such as:
  - The AFHA / (P)ASA / (P)SSA,
  - Important analyses (PRA, ZSA, UERF, …), and
  - important test plans and reports.
— The witnessing of a few selected tests,
— The inspection of few selected aircraft systems, and
— Audits on the development assurance process may be conducted at one or two stages of the process.

Class 4

In addition to what is defined for risk class 3, the involvement comprises:

— The review of more compliance data,
— The witnessing of most of the certification tests,
— The inspection of selected aircraft systems, and
— Audits on the development assurance process may be conducted at more stages of the process.

Attachment 8 - Additional guidance for Environmental Control Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Icing and Environmental Control Systems.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Environmental Control Systems Panel:

— Air Conditioning & Pressurisation,
— Ice Protection,
— Oxygen systems,
— Bleed Air, and
— Water & Waste (ATA 38).

B. Specific Definitions

None.

C. Specific aspects of novelty

None.

D. Specific aspects of complexity

None.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

None.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1

None.

Class 2

The involvement typically may comprise the review of:

— The SFHA and a limited number of test plans/reports and/or analysis;

— The information that summarises the main results of the compliance demonstration and the AFM(S); and

— The expected number of certification meetings is likely to be limited and there should be no or very limited witnessing of tests, or inspections.

Class 3

In addition to what is defined for risk class 2, the involvement may comprise:

— The review of some key certification data such as:
  - The AFHA / (P)ASA / (P)SSA,
  - Important analyses (PRA, ZSA, …), and
  - important test plans and reports.

— The witnessing of a few selected tests,

— The inspection of a few selected aircraft systems, and

— Audits on the development assurance process may be conducted at one or two stages of the process.

Class 4

In addition to what is defined for risk class 3, the involvement comprises:

— The review of more compliance data,

— The witnessing of most of the certification tests,

— The inspection of selected aircraft systems, and

— Audits on the development assurance process may be conducted at more stages of the process.

Attachment 9 - Additional guidance for the aircraft noise, fuel venting and emissions experts

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to environmental protection.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the noise, fuel venting and emissions Panel:

— Noise,
— Emissions, and
— Fuel venting.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

Design:

— New or novel design features for the mitigation of noise, fuel venting or gaseous emissions, such as selectable/variable noise reduction systems (S/V NRS).

Operations:

— New or novel operating procedures for the mitigation of noise, such as the use of thrust lapse (continuous thrust reduction) during take-off.

Compliance Demonstration:

— New procedures for the acquisition of data, analysis and/or adjustment of the measured noise/emissions levels to reference conditions (including new or novel hardware and equivalent procedures), or
— New organisations conducting the tests.

D. Specific aspects of complexity

The complexity may refer to specific design features of the product that are intended to mitigate noise, to fuel venting or emissions, and to technical procedures for the acquisition and processing of data. The following list (not exhaustive) provides examples which may be considered to be complex:

— Staged fuel nozzles, low emission combustors, variable area engine nozzles, the installation of new or changed engines and/or propellers, muffler installations;
— Equivalent procedures that are not referred to in the ICAO Environmental Technical Manual;
— Empirically derived procedures or correction factors, or analytical prediction methods, to determine the effect of changes on noise or emissions characteristics;
— The use of aircraft noise 'family plan' methodologies; or
— The use of operating procedures (e.g. landing flap restrictions) to ensure compliance with the noise requirements.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The risk assessment for determination of the criticality should be commensurate with the risk that a product might be certified with noise and/or emissions levels that are different from the levels that would have been certified if EASA had been fully involved throughout the process. A failure to manage this risk will lead to an uneven 'playing field'.

The determination of the criticality will take into account the following items:

— The sales potential and likely numbers of operations at environmentally sensitive locations;
— The environmental sensitivity of the operating regime and its potential impact on human health and the environment; and
— The potential impact of incorrect or imprecise noise or emissions levels are determined; and
— The potential for a change to have an appreciable effect on the acoustic or emissions characteristics of the changed product.

Points (a) and (b) concern the potential for the aircraft and its operation to have a significant impact on the environment and on human health.

In addition to the risk that an aircraft or engine may be found to be incorrectly compliant with the noise or emissions standards, point (c) also concerns the potential to create an uneven 'playing field' in the context of operating restrictions and landing fees.

G. Specific aspects related to EASA's involvement per risk class

The involvement for each risk class is as follows:

Class 1
None.

Class 2

The involvement of the EASA experts on the project typically includes:

— the review of a limited number of compliance data elements. The expected number of meetings dedicated to noise or emissions certification is likely to be very low. There will be no, or very limited, witnessing of tests, or inspections; and

— the review of information that summarises the main results of the compliance demonstration.

Class 3

The involvement of the EASA experts comprises:

— the review of the selected compliance data related to:
  - The flight or static test programme and the associated reports; and
  - The data acquisition (including novel hardware) and adjustment procedures (including data adjustment software).

— The witnessing of a few selected tests; and

— The possible review and auditing of data acquisition and data adjustment procedures.

Class 4

In addition to the activities for risk class 3, the involvement of the EASA experts comprises:

— The review of the majority of the compliance data, and

— Witnessing of most, if not all, the certification tests, including flight and engine static tests.

Attachment 10 - Additional guidance for Software and Airborne Electronic Hardware

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Software and Airborne Electronic Hardware.

A.2 Applicability / Disciplines

This attachment applies to the following disciplines within the Software and Airborne Electronic Hardware Panel.

— Development Assurance related to software within equipment and systems; and
— Development Assurance related to Airborne Electronic Hardware (AEH) within equipment and systems.

The performance of the DOA holder for the Software and Airborne Electronic Hardware (AEH) Panel may be recorded either at the level of each of these two disciplines, or, for more granularity, at the level of a system or group of systems (e.g. an ATA chapter).

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

Design:

— New or modified development techniques for Software or Airborne Electronic Hardware, or
— New or modified verification techniques for Software or Airborne Electronic Hardware.

Compliance Demonstration:

— New or modified means or methods of demonstrating compliance.

Organisational aspects:

— New subcontractors or innovations in the industrial work share.

D. Specific aspects of complexity

In the context of software and AEH, the complexity of a CDI can be driven by the complexity (or high level of integration) of the system or of the components (software or AEH) itself, or by a specific development environment.

The following list (not exhaustive) provides examples which are considered to be complex:

— Multiple software components implementing multiple functions interacting with each other;
— Multiple functions embedded in the same hardware device;
— Complex architectures (e.g. Integrated Modular Avionics (IMA)) intended to support several aircraft functions;
— The introduction of complex work sharing between system / equipment / software (or AEH) suppliers;
— For major changes, the complexity of the change should be taken into account rather than the complexity of the original system; or
— The use of analytical methods.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The different software or AEH design assurance levels map as follows to the criticality classes:

— Critical: DAL A or DAL B; and
— Non-Critical: DAL C or DAL D.

G. Specific aspects related to the involvement per risk class

The risk classes table has been adapted in the following way:

Step 2: Risk classes

Likelihood / Criticality	Very low	Low	Medium	High
Non-Critical - DAL D	Class 1	Class 1	Class 1	Class 2
Non-Critical/Critical* - DAL C	Class 1	Class 1	Class 2	Class 3
Critical - DAL B	Class 1	Class 2	Class 3	Class 3
Critical -–DAL A	Class 1	Class 2	Class 3	Class 4

DAL C equipment that contributes to hazardous or catastrophic failure conditions is classified as critical.

The activities within each of the risk classes are:

EASA LoI	Desktop and on-site audits					Document review		
	Number of on-site audits	Planning audit (desk-top)	Develop-ment audit (on- site)	Verifica-tion audit (on- site)	Final audit (desk -top)	PSAC/PHAC and related SW/AEH plans	SAS/HAS + SCI/HCI	Applicant SW/AEH Review report
Class 1	None	None	None	None	None	None	None	None
Class 2	None	Yes	None	None	Yes	Yes	Yes	None
Class 3	1	Yes	Yes		Yes	Yes	Yes	Upon request
Class 4	As necessary *	Yes	Yes	Yes	Yes	Yes	Yes	Upon request

*Note *: for risk class 4, typically 2 on-site audits are foreseen. However, EASA may decide to combine the development audit and the verification audit into one on-site audit. Failed audits may also trigger complementary audits.*

An audit may be conducted at the EASA expert's own desk (a desktop audit), at an applicant's facility or at an applicant's subcontractor's facility (an on-site audit).

Attachment 11 - Additional guidance for Cabin Safety

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of the EASA level of involvement related to Cabin Safety.

A.2 Applicability / Disciplines

This attachment has been specifically developed to address the following Cabin Safety disciplines:

— Cabin Installation (including Emergency Medical Systems, VIP interiors, Crew Rest Compartments, Courier Compartments, etc.);
— Flight Deck installation;
— Cargo compartments (installation & restraint);
— Occupant crashworthiness/restraints
— Fire protection – pressurised areas (active and passive);
— Occupant evacuation;
— Internal and External placards and markings;
— Rotorcraft External Human and Cargo Restraints; and
— Security aspects.

B. Specific Definitions

None.

C. Specific aspects of novelty

None.

D. Specific aspects of complexity

None.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The following non-exhaustive list provides further guidance for identifying a 'critical' criticality determination. Some aspects as identified may be specific to one particular type of product (Large Aeroplanes, Rotorcraft….) and should not be considered if not relevant.

Aspects of criticality determination	Critical Condition	Consequences of non-compliance
Emergency Evacuation	Significant evacuation delay	Loss of lives during time-critical evacuation
	Compromised passenger seat crashworthiness	Failure of seats, leading to injuries or fatalities and /or compromising the evacuation path
	Inadequate cabin crew action due to inadequate cabin crew number, position, procedures	Loss of lives during time-critical evacuation
Fire protection	Inadequate flammability behaviour of cabin interiors	Injuries or fatalities due to rapid fire propagation in cabin during flight or post-crash
	Flame propagation in a hidden area	Undetected or inaccessible in-flight fire leading to injuries and/or fatalities
	Flame burn-through in post-crash fire event	Entry of fire into the cabin before/during evacuation leading to injuries and/or fatalities
	Inadequate performance of firefighting system/equipment in pressurized area	Uncontrolled fire in pressurized area leading to injuries and/or fatalities

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1
None.

Class 2

The involvement of the EASA experts on the project is limited to the review of a small amount of compliance data, and may include a cabin inspection if the cabin interior modification introduces a

significant novelty. The expected number of certification meetings is limited and there should be no or very limited witnessing of tests, or inspections.

Class 3

In addition to what is defined for risk class 2, the involvement of the EASA experts comprises:

— The review of compliance data such as:
  - The AFHA / (P)ASA / SFHA / (P)SSA,
  - important analyses (PRA, ZSA, …),
  - important test plans and reports, and
  - Other specific data may be requested.
— The witnessing of a few selected tests;
— The inspection of a few selected aircraft systems;
— The inspection of the interior; and
— An increased number of certification meetings.

Class 4

In addition to what is defined for risk class 3, the involvement increases to a larger number of subjects.

Attachment 12 - Additional guidance for the Development Assurance and Safety Assessment Panel

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Development Assurance and Safety Assessment panel.

A.2 Applicability / Disciplines

This attachment applies to the Development Assurance and Safety Assessment (DASA) Panel.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples of novelties that are specific to the disciplines of the Development Assurance and Safety Assessment Panel. Some novelties that are identified may be specific to one particular type of product (e.g. Large Aeroplanes, Rotorcraft…). Therefore, they should not be considered if they are not relevant.

		Development Assurance (DA)	Safety Assessment (SA)
Novelties	Certification Specifications (Book 1 and Book 2)	– Significant change in the applicable 2X.1309 and associated AMC (e.g. development assurance aspects)	– Significant change in the applicable 2X.1309 and associated AMC (e.g. specific risk aspects)
	Interpretation	– First implementation of an ARP 4754 version	– First implementation of an ARP 4761 version – First implementation of the F/IDAL assignment process, as intended by the ARPs – First application of an EASA certification memorandum – First application of an FAA policy statement (e.g. runway excursion classification) if the

		Development Assurance (DA)	Safety Assessment (SA)
			compliance finding is delegated to EASA
	Means of compliance	– Use of new or updated Development Assurance procedures – Use of a new requirement management tool – Use of criteria to limit the applicability scope of Development Assurance aspects for certification	– Use of new or updated Safety Assessment procedures – Use of a new safety tool (e.g. MBSA) – First application of a new safety assessment/analysis (AFHA, PASA, ASA, A-FTA, …)

D. Specific aspects of complexity

The following list of complexity specific to the Development Assurance and Safety Assessment disciplines are proposed to support and ease the determination of the LoI for the DASA expert. This list is not exhaustive.

		Development Assurance (DA)	Safety Assessment (SA)
Complexity	Technology		- Shared data and resources
	Organisation aspects	- Introduction of a complex work-sharing scheme with system / equipment suppliers	- Introduction of a complex work-sharing scheme with system / equipment suppliers

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The following list of critical/non-critical products specific to the Development Assurance and Safety Assessment disciplines are proposed to support and ease the determination of the LoI for the DASA experts. This list is not exhaustive.

	Development Assurance (DA)	Safety Assessment (SA)
Critical	- CS-23 commuter, CS-25, CS-29, RPAS or any other complex innovative products, - Related significant changes,	- CS-23 commuter, CS-25, CS-29, RPAS or any other complex innovative products, - Related significant changes,

	Development Assurance (DA)	Safety Assessment (SA)
	- Electronic Engine Control Systems (EECS) for CS-E products installed on CS-23 commuter, CS-25, CS-29, RPAS or on any other complex innovative products	- Related CS-E products
Non-critical	All other products or changes	All other products or changes

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

Class 1
None.

Class 2

The involvement typically includes the review of
— the Development Assurance Plan;
— the Safety Program Plan; and
— the information that summarises the main results of the compliance demonstration related to DASA activities.

The AFHA, where provided, and other specific data, may be requested for review. The number of certification meetings is likely to be limited.

Class 3
In addition to the activities described for risk class 2, the involvement comprises the review of key compliance data elements such as the AFHA, PASA, or the ASA.

Any other specific data items, which support the review and acceptance of the above referenced data, may be additionally requested.

ED-79A audits on the development assurance process at the aircraft level may be conducted at one or two stages of the process.

Class 4

The involvement of the DASA expert comprises, but is not limited to, the activities described for risk class 3.

ED-79A audits on the development assurance process at the aircraft level may be conducted at every stage of the process.

Attachment 13 - Additional guidance for Rotorcraft Transmissions

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Transmissions.

A.2 Applicability

The attachment applies to the Rotorcraft Transmissions Panel.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel for Design and manufacturing:

— New materials, such as new metal alloys or composites;
— New combinations of materials;
— New applications for materials or combinations of materials (composites 'tailored' to designs);
— New manufacturing processes, such as additive manufacturing or laser welding;
— A new use of Electronic Flight Control Systems;
— New engine technologies;
— Changes to the configuration of the drive system or lubrication system;
— VHM, SHM, or new NDIs; or
— New or unusual rotorcraft configurations.

Operation:

— New or unusual operations, or changes to operations.

Requirements:

— Whether a key or sensitive Certification Specification or AMC is invoked that is still not fully accepted/understood (e.g. for the loss of oil).

D. Specific aspects of complexity

The following list (not exhaustive) provides examples which are considered to be complex:

— Difficulty in establishing and validating the boundary conditions used during finite element modelling,

— Identifying and addressing the locations and effects of residual stresses,
— Health / condition monitoring,
— Difficulty in evaluating the links between degradation and critical failures,
— Difficulty in the classification of the hazard criticality of failure modes identified in the failure analyses,
— Emergency procedures written into the RFM and the associated assumptions made regarding pilot performance, and
— Difficulty in identifying all the relevant factors in design, manufacturing and service that could affect the integrity of critical parts.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

In addition to the generic guidance, the establishment of the criticality should take into account whether the affected components are classified as critical (see CS 27/29.602).

Furthermore, the following provisions are always considered to be critical when determining the LoI related to transmissions: 29.303 Factor of Safety, 29.361 Engine Torque, 29.547(b) Rotor Drive System, 29.571 Fatigue Evaluation of Flight Structure, 29.601 Design, 29.602 Critical Parts, 29.619 to 25.625 covering various factors, Rotor Drive System, 29.917 Design, 29.921 Rotor brake, 29.923 Rotor Drive System and control mechanism tests, 29.927 Additional tests, Instruments Installation 29.1322, 29.1337(d) Oil quantity indicator, 29.1337(e) Rotor drive system chip detectors, Operating limitations 29.1527 maximum operating altitude, and 29.1529 ICA.

G. Specific aspects related to the involvement per risk class

None.

Attachment 14 - Reserved

Reserved

Attachment 15 - Additional guidance for OSD-MMEL

A. Purpose and Applicability

A. Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Operational Suitability Data for MMEL.

A2. Applicability

This attachment applies to the OSD-MMEL Panel.

B. Specific Definitions

None.

C. Specific aspects of Novelty

The level of novelty of the MMEL project can be associated with the level of new/modified methods of providing justifications.

If the level of new/modified justification methods is considerable or the knowledge of the original justification methods is insufficient to assess it, the associated MMEL project should be classified as being 'novel' for the purpose of the LoI determination.

Conversely, a CDI for a MMEL item may be considered to not be novel when it only requires the transposition of existing compliance data from already approved MMEL items to the new/modified type design configuration, or using the EASA CS-MMEL guidance material.

For example, the introduction of a new air conditioning pack on a new aircraft type may rely, as far as MMEL justifications are concerned, on previously agreed considerations and subsequent limitations. This item may therefore be considered to not be novel for MMEL (it may however be retained as being novel for the certification of the type design).

D. Specific aspects of Complexity

Although carrying out a quantitative analysis is not complex per se, an MMEL CDI with complex aspects will typically be an item for which the analysis of the consequences of the addressed failure, or the determination of the next worst failure/event, is of a complex nature either because of the multiple failure modes that are covered, the high level of the interrelationships with other aircraft systems, or the elaborated means of mitigation that are proposed.

Items for which the demonstration of compliance can be performed through straightforward engineering judgement that do not require safety analysis or evaluation of the impact on the crew workload or existing procedures, and which do not necessitate mitigations means to ensure that an acceptable level of safety is maintained (GO items), are not considered to be complex.

If dispatch conditions or procedures are only introduced based on a conservative approach, the associated items may still not be considered to be complex.

For example, the justification for an MMEL item on the system that provides the aircraft flight/ground position may involve a large number of consequences on other aircraft systems using this information, and may therefore be classified as being complex.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of Criticality

Items that are typically covered in MMELs are related to systems or components which are in a failed state at dispatch. When the failure effects at dispatch are not considered to be acceptable, mitigation means are proposed to ensure that an acceptable level of safety is maintained for the candidate items.

The criticality of an unidentified non-compliance may be critical if the proposed means of mitigation are not adequate to ensure an acceptable level of safety as required by the MMEL certification basis. This is the case when the non-mitigated effects of the failure or the next worst failure/event are:

— classified as hazardous or catastrophic at the aircraft level, or
— not covered by the crew procedures, airworthiness or operating limitations that are applicable to the full-up configuration.

The criticality of an unidentified non-compliance is also considered to be critical when the compliance demonstration for MMEL includes a quantitative assessment as required per CS-MMEL 145 (d) or a similar means of compliance. On the contrary, an item that ensures functions that are not related to the airworthiness or operational requirements, as well as an item that is fully redundant, for which no quantitative assessment is required, would not be considered to be critical. Furthermore, whilst conducting continuing airworthiness oversight activities, evidence of any aspect that has a potential impact on the MMEL may lead EASA to reinforce its LoI on the specific related projects.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

OSD-MMEL risk class 1

None.

OSD-MMEL risk class 2

The involvement may comprise:

— review of the proposed content of the MMEL and, if determined necessary by EASA, review of a few selected compliance data elements (MMEL justifications).

OSD-MMEL risk class 3

In addition to those defined for risk class 2, the involvement may comprise:

— Review of a few compliance data elements (MMEL justifications);
— Investigation meetings that involve, where necessary, coordination with experts from other Panels.

OSD-MMEL risk class 4

In addition to those defined for risk class 3, the involvement may comprise:

— Review of most of the compliance data (MMEL justifications).

Attachment 16 - Additional Guidance for OSD Simulators

A. Purpose and Applicability

A. Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Operational Suitability Data for flight simulators.

A2. Applicability

This attachment applies to the OSD-Simulator Panel.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

— New design features on the aircraft (e.g. installation of a HUD; avionics features; an option for a different engine type; revision levels that affect the handling qualities and performance);
— Additional functionality on the aircraft or aircraft operations that require additional validation of the source data (e.g. auto-brakes with RTO; going from no auto-land capability to an auto-land capability);
— New equipment (e.g. use of EVS);
— An extension of the training envelope that requires new validation source data, or extension of its scope (e.g. UPRT, stall training).

D. Specific aspects of complexity

None.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The criticality for the OSD SIM domain resides with the correct and complete provision of the scope of the validation source data, for the compliance with the provisions laid down in air crew regulations with regard to the objective qualification of full flight simulators (FFS) and Level 3 flight training devices (FTD) for specific aircraft types and variants, established in order to support end users (e.g. FFS/FTD manufacturers and FFS/FTD operators).

In terms of the potential safety consequences, an incorrect, incomplete, or non-compliant scope of the validation source data may lead to inadequate data being used by the FFS/FTD manufacturer. This would result in a non-qualifiable FFS/FTD, which could eventually lead to inappropriate training of flight crews or to inconsistencies between devices that replicate the same type of aircraft. The criticality can be identified as being specific to one or more items contained in the following generic categories of information, which constitute the type specific validation data of the FFS/FTD:

— The use of engineering validation data to selectively supplement flight test data;
— A change of an audited and agreed process to provide engineering validation data;
— Specific aircraft operations (e.g. steep approaches);
— Validation source data related to Training Areas of Special Emphasis (TASE);
— Provision of validation data to objectively evaluate specific operations or equipment; or (additional features e.g. Low Visibility Operations, Steep Approaches, HEMS, specific rotorcraft kits, HUD, etc.).

The determination of the scope of the validation source data within CS-SIMD is based on the certification specifications extracted from CS-FSTD(A)&(H) and the additional features selected by the applicant.

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

OSD-SIM risk class 1

None.

OSD-SIM risk class 2

The involvement may comprise:

— accepting product-level assessments related to the approval of Operational Suitability Data – SIM.

OSD-SIM risk class 3

In addition to those defined for risk class 2, the involvement may comprise:

— Review of the applicant's plan to provide the required validation source data, including all methods and sources used; and
— Joint review of compliance data with Panel 16 / OSD SIM.

OSD-SIM risk class 4

In addition to those defined for risk class 3, the involvement may comprise:

— Review of the applicant's plan to provide the required validation source data, including all the methods and sources used;
— On-site audit of the engineering simulator/simulation and the associated processes and programmes to selectively supplement the flight test data;
— Review and acceptance of the validation data roadmap (VDR);
— Joint full review of compliance data with the applicant; and
— On-site audit at the site of the end-user to confirm the suitability of validation source data as a reference for the certification specifications as given by CS-FSTD(A)&(H).

Attachment 17 - Additional Guidance for OSD - Cabin Crew

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the OSD Cabin Crew (OSD-CC).

A.2 Applicability

This attachment applies to the following aspects within the OSD - Cabin Crew activity:

— determination of a new aircraft type or variant for cabin crew, and
— Establishment of cabin crew type specific data associated with the respective aircraft type or variant.

B. Specific Definitions

New type	An aircraft different from the base aircraft requiring completion of cabin crew aircraft type-specific training
Variant	An aircraft that has differences to the base aircraft requiring completion of cabin crew differences training
Base aircraft	An aircraft used as reference to compare differences with another aircraft
Type specific data	All design related data relevant to new type(s) or variant(s)

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may considered to be novel:

— New cabin crew tasks or roles, and
— The use of specific technology, which requires unusual cabin crew knowledge, skills or means of training (e.g. training methods, training devices).

D. Specific aspects of complexity

The compliance demonstration for requirements of a subjective nature may be considered to be a complex demonstration. In particular, this applies to scenario-based compliance demonstrations that involve a subjective performance assessment of cabin crew skills and attitudes to determine:

— The new type or variant for cabin crew,
— The feasibility of cabin crew tasks,

— The type specific data associated with the respective aircraft type or variant, and
— New or unusual training methods and devices.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The criticality for the OSD-CC domain resides with the correct and complete identification of aircraft-specific OSD cabin crew data (established in order to support 'end users'[1]) for the compliance with the provisions laid down in the Air Operations regulations with regard to cabin crew operations on aircraft types and variants.

In terms of the potential safety consequences, incorrect, incomplete, or non-compliant cabin crew type specific data may lead to inadequate cabin crew training information at the operator level, and eventually to unsafe cabin crew operations on the respective aircraft type or variant.

G. Specific aspects related to the involvement per risk level

Typically, an initial OSD-CC approval, or a major change to the OSD-CC, will always require EASA's involvement, using scenario-based evaluation.

However, when evaluating a major change to the type certificate where the related OSD-CC change has been classified as being minor based on the guidance for the classification of changes to the OSD, the activities of the OSD Cabin Crew Panel are determined according to the risk classes. In these cases, the following will apply:

Activities for OSD-CC risk class 1: No further involvement.

Activities for OSD-CC risk class 2: the involvement of the OSD Cabin Crew expert is limited to the review of selected OSD CC compliance data.

Activities for OSD-CC risk class 3: In addition to what is defined for risk class 2, the OSD Cabin Crew Panel participates in selected compliance activities.

Activities for OSD-CC risk class 4: In addition to what is defined for risk class 3, the OSD Cabin Crew Panel witnesses specific certification tests relevant to the establishment of the OSD Cabin Crew Data (e.g. partial testing; emergency evacuation demonstration, etc.).

[1] E.g. operators, training organisations.

Attachment 18 - Additional guidance for the OSD Maintenance Certifying Staff Panel

A. Purpose and Applicability

A1. Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to the Operational Suitability Data for Maintenance Certifying Staff.

A2. Applicability

This attachment applies to OSD for the Maintenance Certifying Staff Panel.

B. Specific Definitions

Maintenance Areas of Specific Emphasis (MASE)	*Maintenance areas of special emphasis (MASE)* means any element considered by the applicant as having a degree of novelty, specificity or uniqueness relevant to the maintenance of its aircraft. This could be a technical or operational feature that maintenance personnel need to be aware of and take into consideration. MASE are also knowledge, training and assessment areas that the applicant considers necessary to highlight because it is type-related and safety-related.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

— Tilt rotor aircraft;
— New aircraft systems architectures;
— Unconventional designs: e.g. systems actuated by electrical power, including by an EABS (Electrically Actuated Braking System), or an EHA/EMA (Electro-Hydraulic Actuator/Electro-Mechanical Actuator).
— New engine technologies: e.g. electrical engine generation;
— New avionic features;
— New maintenance practices (e.g. new techniques and aids for inspections, NDT, troubleshooting; new Diagnostic and Maintenance systems);
— New aircraft accessibility provisions;
— New components;
— New materials;
— New tools;
— Use of MSTD; or

— An unusual format of the maintenance instructions.

D. Specific aspects of complexity

None.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of Criticality

The criticality for the OSD-MCS domain resides in the correct and complete identification of the aircraft-specific configuration, established through OSD-MCS to support the compliance of the 'end users'[2] with the provisions laid down in Annex III (Part-66) of Regulation (EU) No 1321/2014 with regard to specific aircraft types and variants.

In terms of potential safety consequences, incorrect, incomplete, or non-compliant MCS type-specific data may lead to ineffective MCS training at the training organization level, and eventually to unsafe MCS maintenance on the respective aircraft type or variant. The criticality can be specific to one or more items contained in the following generic categories of information, which constitute the content of the MCS type-specific data:

— The aircraft classification (Group 1 or not);
— The aircraft configuration (relevant to maintenance type training);
— The determination of the type rating (grouping variants in the same type rating); or
— The training on the MCS type rating (e.g. the content of the minimum syllabus; the identification of MASE).

G. Specific aspects related to the involvement per risk class

Specific aspects related to EASA's involvement per risk class:

OSD-MCS risk class 1

— Agreement on the determination of the Maintenance Type Rating (new type or variant).

OSD-MCS risk class 2

In addition to what is defined for risk class 1, the involvement may comprise:

— A review of the justification documents (the approach and methodology used by the Applicant).

Activities for OSD-MCS risk class 3

In addition to what is defined for risk class 2, the involvement may comprise:

— A sampling review of the minimum syllabus (the deliverable documents for end-users).

[2] E.g. operators, training organisations.

Activities for OSD-MCS risk class 4

In addition to what is defined for risk class 3, the involvement may comprise:

— A complete review of the minimum syllabus (the deliverable documents for end-users);
— An on-site audit relevant to verify, at aircraft level, the MASE.

Attachment 19 - Additional guidance for Propulsion

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of EASA's level of involvement related to Propulsion.

A.2 Applicability

This attachment applies to the following Products:

— The certification of Engines;
— The qualification of Propellers;
— The qualification of APUs; and
— Electrical propulsion.

Note:

For engine emissions, refer to attachment 9 of this CM.

For engine control Software and Airborne Electronic Hardware (AEH), refer to attachment 10 of this CM.

B. Specific Definitions

Sub-system	A sub-system of an Engine, Propeller or APU, is any sub-group of the parts of the product, selected by the applicant as bearing commonality for the purpose of demonstrating compliance with one (or several) requirement(s). It may (but not necessarily) form a meaningful group of parts for the purpose of an assembly or function within the product.
Summary Compliance Documents	Summary compliance documents, also called 'high-level' or 'level-one' documents, generally contain a summary of the compliance demonstration. Further details are deferred to 'lower-level' documents.
Lower level Compliance Documents	Lower-level compliance documents, also called 'level-two' / level-'three' documents. They contain more details of the test results, include the assumptions, detailed steps and the results of analyses, etc.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which may be considered to be novel:

— A novelty in the design or technology, such as, but not limited to:
  - A novel design of a part;
  - Novel materials, manufacturing or assembly processes;
  - A novel arrangement or architecture of a group of parts, of a sub-system, or of the whole product;
  - A novel interfaceor interaction with other part(s) or system(s) of the aircraft, including the incorporation of type design features which are normally certified as part of the aircraft; or
  - Novel operating conditions, limitations, instructions or usage of a part, of a group of parts, of a sub-system, or of the whole product.

D. Specific aspects of complexity

None.

E. Specific aspects of the performance of the Design Organisation

None.

F. Specific aspects of criticality

The specifications from CS-E 210 Failure Analysis, CS-E 510 Safety Analysis, CS-P 150 Safety Analysis, CS-APU 210 Safety Analysis, as applicable, should be used for the safety assessments and associated classifications. Minor, major, and hazardous effects should gradually result in low to higher criticality.

Where applicable, the applicant may use their experience on past certification projects, or service experience, in the safety assessment.

If found to be practical for the purpose of the determination of the LoI, the applicant may propose a number of levels of criticality. At a minimum, there should be two levels: critical and non-critical. These levels may be, but are not necessarily, based on a proposed weighing method for criticality.

G. Specific aspects related to the involvement per risk class

For engines/propellers/APUs, the activities performed by EASA as a consequence of the different risk classes are, for each CDI:

Class 1:	No specificities.
Class 2:	The EASA involvement is typically limited to the review of a small amount of compliance data. If applicable, this could also mean a review of the 'summary' compliance data only. No participation, or participation in a very small number of compliance activities (i.e. witnessing of tests, audit, etc.).
Class 3:	In addition to what is defined for risk class 2, the EASA involvement typically also comprises the review of more compliance data. If applicable, this could also mean a review of a selection of 'lower-level' compliance data elements. The participation in some compliance activities (witnessing of tests, audits, etc.).
Class 4:	In addition to what is defined for risk class 3, the EASA involvement typically comprises the review of a large number of compliance data elements. If applicable, this could also mean a review of a large amount of 'lower level' compliance data. The participation in a large number of compliance activities (witnessing of tests, audits, etc.) and the participation in the interpretation of test results.

Note: In the specific case where it is anticipated that a non-EU Validation Authority (VA) will focus on particular CDI(s), the applicant may agree with EASA on a higher LoI in order to facilitate discussions with the VA.

Attachment 20 - Determination of the Risk Class

		Risk Class		
Non-Critical consequences of a non-compliance	The CDI has no novel aspects, no complex aspects	**Class 1**	**Class 1**	**Class 2**
	The CDI has no novel aspects, but has complex ones; or has novel aspects, but no complex ones	**Class 1**	**Class 2**	**Class 3**
	The CDI has both novel and complex aspects	**Class 2**	**Class 3**	**Class 3**
Critical consequences of a non-compliance	The CDI has no novel aspects, no complex aspects	**Class 1**	**Class 2**	**Class 3**
	The CDI has no novel aspects, but has complex ones; or novel aspects, but no complex ones	**Class 2**	**Class 3**	**Class 4**
	The CDI has both novel and complex aspects	**Class 3**	**Class 4**	**Class 4**
		performance high	**performance Medium**	**performance low or unknown**

Attachment 21 - Abbreviations

AEH	Airborne Electronic Hardware
AFHA	Aircraft Functional Hazard Assessment
AFM(S)	Aircraft Flight Manual (Supplement)
A-FTA	Aircraft Fault Tree Analysis
AMC	Acceptable Means of Compliance
APU	Auxiliary Power Unit
ARP	Aerospace Recommended Practice
ASA	Aircraft Safety Assessment
ASOG	Aircraft Security Operator Guidance
ASRA	Aircraft Security Risk Assessments
ASSD	Aircraft Security Scope Definition
ASV	Aircraft Security Verification
BQRS	Back up Quick Release System
CC	Cabin Crew
CCD	Cabin Crew Data
CDI	Compliance Demonstration Item
CFTP	Certification Flight Test Plan
CM	Certification Memorandum
CRI	Certification Review Item
CS	Certification Specification
CS-ACNS	Certification Specification for Airborne Communication, Navigation and Surveillance
CSTP	Certification Simulator Test Programme
DAL	Design Assurance Level

DASA	Development Assurance and Safety Assessment
DOA	Design Organisation Approval
EABS	Electrically Actuated Braking System
EECS	Electronic Engine Control Systems
ECL	Electronic Checklist
EHA	Electro-Hydraulic Actuator / Electro-Hydrostatic Actuator
EMA	Electro-Mechanical Actuator
EMC	Electromagnetic Compatibility
EMI	Electro Magnetic Interference
ETOPS	Extended Operations
EVS	Enhanced Vision System
EWIS	Electrical Wiring and Interconnection System
FAA	Federal Aviation Administration
FC	Flight Crew
FCL	Flight Crew License
FCS	Flight Control System
FFS	Full Flight Simulator
F/IDAL	Function / Item Design Assurance Level
FM	Flight Manual
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
FTE	Flight Test Engineer
FTP	Flight Test Pilot
GM	Guidance Material
HAS	Hardware Accomplishment Summary
HCI	Hardware Configuration Index

HEMS	Helicopter Emergency Medical Service
HF	Human Factors
HIRF	High Radiation Frequency
HM	Hydromechanical
HMI	Human Machine Interface
HQ	Handling Qualities
HUD	Head Up Display
HW	Hardware
IFR	Instrument Flight Rules
IMA	Integrated modular avionics
LoI	Level of Involvement
LVO	Low Visibility Operation
MASE	Maintenance Areas of Specific Emphasis
MBSA	Model-Based Safety Assessment
MCS	Maintenance Certifying Staff
MMEL	Master Minimum Equipment List
MoC	Means of Compliance
MRBR	Maintenance Review Board Report
MSTD	Maintenance Simulation Training Device
NDI	Non-Destructive Inspection
NDT	Non Destructive Testing
OPR	Open Problem Report
OSD	Operational Suitability Data
PASA	Preliminary Aircraft Safety Assessment
PHAC	Plan for Hardware Aspects of Certification
PQRS	Primary Quick Release System

PRA	Particular Risk Analysis
PSAC	Plan for Software Aspects of Certification
PSecAC	Plan for Security Aspects of Certification
RAT	Ram Air Turbine
RFM	Rotorcraft Flight Manual
RNP-AR	Required Navigation Performance Authorization Required
ROAAS	Runway Overrun Awareness and Alerting Systems
RPAS	Remotely Piloted Aircraft System
RTO	Rejected Take OFF
RVSM	Reduced Vertical Separation Minimum
SAS	Software Accomplishment Summary
SC	Special Condition
SCI	Software configuration index
SEI	Sustained Engine Imbalance
SFHA	System Functional Hazard Assessment
SHM	Structural Health Monitoring
SIM	Simulator
SIMD	Simulator Data
SSA	System Safety Analysis
SSIG	System Security Integrator Guidance
SSRA	System Security Risk Assessment
SSSD	System Security Scope Definition
SSV	System Security Verification
S/V NRS	Selectable/Variable Noise Reduction Systems
SVS	Synthetic Vision Systems
SW	Software

TASE	Training Areas of Special Emphasis
TAWS	Terrain Awareness and Warning System
TC	Type Certificate
TCAS	Traffic Collision Avoidance System
THSA	Trimmable Horizontal Stabiliser Actuator
UAV	Unmanned Aircraft System
UERF	Uncontained Engine Rotor Failure
UPRT	Upset Prevention and Recovery Training
VA	Validation Authority
VDR	Validation Data Roadmap
VFR	Visual Flight Rules
VHM	Vehicle Health Monitoring
VIP	Very Important Person
ZSA	Zonal Safety Analysis