Notification of a Proposal to issue a Certification Memorandum

Criteria for the determination of the Agency's level of involvement in product certification

EASA Proposed CM No.: Proposed CM–21.A/21.B-001 Issue 01 issued 23 January 2017

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, 21.B.103 (a)(2), 21.B.107 (a)(2), 21.B.110 (a)(2), 21.B.115 (a)(2) and 21.B.117 (b) [1]

In accordance with the EASA Certification Memorandum procedural guideline, the European Aviation Safety Agency proposes to issue an EASA Certification Memorandum (CM) on the subject identified above. All interested persons may send their comments, referencing the EASA Proposed CM Number above, to the e-mail address specified in the "Remarks" section, prior to the indicated closing date for consultation.

About Certification Memoranda

EASA Certification Memoranda clarify the Agency's general course of action on specific certification aspects. They are intended to provide guidance on a particular subject and, as non-binding material, may provide complementary information and guidance. Certification Memoranda are provided for information purposes only and must not be misconstrued as formally adopted Acceptable Means of Compliance (AMC) or Guidance Material (GM). Certification Memoranda are not intended to introduce new requirements or to modify existing requirements and do not constitute any legal obligation. Applicants may use the guidance provided in this CM in order to comply with the above mentioned regulatory requirements, but they may also propose to comply differently.

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.

[1] As proposed per EASA Opinion 07-2016.

Background of this Certification Memorandum

On 23 May 2016, the Agency published Opinion 07/2016 about the embodiment of level of involvement requirements into Part-21. This proposal includes, amongst other things, a new requirement for applicants to propose to the Agency the Agency's level of involvement (LoI) in compliance verification, a new requirement for the Agency to determine its LoI using a risk based approach, and some non-exhaustive criteria to be used for this risk based LoI determination. This is laid down in the proposals for an amended point 21.A.15 and in the proposal for a new point 21.B.100. Other relevant points can be found in points 21.A.93 (b)(3)(ii) and (iii), 21.A.113 (b), 21.B.103 (a)(2), 21.B.107 (a)(2), 21.B.110 (a)(2), 21.B.115 (a)(2) and 21.B.117 (b).

The proposed amendments are not yet adopted by the European Commission. The Agency expects that the European Commission adopts the amendment to Part-21 in the first half of 2017. The proposal foresees that the new requirements shall become applicable as of February 2018.

The Agency decided not to develop AMC/GM at this stage, but to provide guidance in form of a CM on how it intends to apply these new requirements. The guidance will be tested and – at a later stage – transposed into AMC/GM, using the Rulemaking Procedure[2].

Specific question for consultation

1. The guidance provided in this CM consists of a generic part and 20 attachments, 18 of which are providing specific guidance and examples for the panels (and related disciplines) affected by the certification project. In addition to comments of interested persons on the contents of this CM, the Agency is also interested in receiving comments on the level of detail provided in this CM.

2. The Agency aims at establishing proportionate guidance material. The draft guidance in this CM (especially for the application of the various LoI criteria) generally allows to apply a proportionate approach, in particular to differentiate between large aircraft and general aviation aircraft projects. However the Agency is further evaluating the proportionality for GA products (in particular at the lower end of GA) and it is interested in receiving comments on the current approach, and proposals on how to ensure proportionality, e.g. for LoI determination in GA projects.

[2] EASA is bound to follow a structured rulemaking process as required by Article 52(1) of Regulation (EC) No 216/2008. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

Log of issues

Issue	Issue date	Change description
01	23.01.2017	First issue.

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1. General

1.1. Purpose

The purpose of this Certification Memorandum is to:

- provide guidance to applicants when proposing compliance demonstration items (CDIs) and the Agency's level of involvement (LoI), and
- explain the criteria used by the Agency when determining the Agency's involvement in product certification projects.

1.2. Definitions

Risk	The combination of the likelihood and the level of severity that are associated to a non-compliance with part of the certification basis
Likelihood	A prediction of how likely an occurrence of a non-compliance with part of the certification basis is, based on a combination of novelty and complexity of the proposed design and its related compliance demonstration activities, and the performance of the design organisation
Severity	A measure of the potential impact of the non-compliance with part of the certification basis on product safety or associated with the environment
Certification Summary	Information summarising the main results of the compliance demonstration at the level of the Certification Programme[3]
Compliance Demonstration Item (CDI)	A meaningful group of compliance demonstration activities and data identified in the certification programme, which can be considered in isolation for the purpose of demonstrating compliance

2. Background and applicability

2.1. Background

The applicant has to submit, either with the application or afterwards as a supplement, a certification programme for its compliance demonstrations. The certification programme is broken down into CDIs, and the applicant's proposal for the Agency's LoI. The applicant may also specify the panel(s) which are relevant to each CDI.

[3] It shall be noted, that the use of certification summary documents is left to the discretion of the applicant.

Having received the application with the above mentioned information, a certification project is established by EASA. A certification project is organised into four phases, these being:

Phase I – Technical Familiarisation and establishment of the Initial Certification Basis
Phase II – Acceptance of the Certification Programme and Level of Involvement determination by the Agency
Phase III – Applicants compliance demonstration
Phase IV – Final Report and issue of the Certificate

The appropriate and proper familiarisation with the certification project is an essential prerequisite for the determination of the Agency's LoI. During Phase I the Agency will also determine the composition of the certification team. An expert with a certain technical discipline that is involved in the project will in all cases need to understand the project design and the applicants' approach to the certification of that design, including the MoC and how compliance will be demonstrated, in order to determine the LoI. Only after having familiarised itself with the certification project, will the Agency then determine its LoI as part of the activities in Phase II of the certification project.
Note: Due to the nature of their work, each technical discipline may progress through the phases of the certification project at a different pace.

This Certification Memorandum explains how the Agency will make its determination on its LoI on the basis of the criteria established in Part-21. It is provided to industry in order to enable them to make the appropriate proposal according to 21.A.15 (b)(5) and (6), 21.A.93 (b)(3)(ii) and (iii), and 21.A.113 (b).

It should be noted that according to Part-21 the applicant has to update the certification programme as necessary during the certification process and report to the Agency any difficulty or event encountered during the compliance demonstration process that may necessitate a change to the LoI previously notified to the applicant. In this case or when the Agency has other information affecting the assumptions of the LoI, the Agency 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 changes the LoI, it is essential that a smooth process between the applicant and EASA is ensured. Both parties - in mutual trust – should ensure that the project is not delayed because of the need to determine the LoI.

This Certification Memorandum is complemented by domain specific additional guidance, which is attached to this Certification Memorandum.

Note: This Certification Memorandum should not be considered as guidance for the classification of changes or repairs.

2.2. Applicability

This Certification Memorandum is only applicable to DOA holders. Projects from non DOA holders (including ADOA) will be handled as before.

3. Principles and generic criteria for LoI determination

The Agency determines its LoI based on the applicant's proposal in view of the risk (the combination of the likelihood of an unidentified non-compliance and the level of severity of the consequences of it). This is done in three steps: identification of the likelihood of an unidentified non-compliance, identification of the risk class, and the determination of the Agency's involvement.

This chapter comprises the following sections:

- Section 3.1 reminds that LoI is determined at CDI level,
- Section 3.2 describes the method used by the Agency to determine the likelihood of an unidentified non-compliance (step 1),
- Section 3.3 describes the severity determination of the consequences of an unidentified non-compliance,
- Section 3.4 describes the risk class determination on the basis of the likelihood of an unidentified non-compliance and the severity of the consequences (step 2), and
- Section 3.5 describes the determination of the Agency's involvement on the basis of the risk class determined (step 3).

The criteria used to define the likelihood and the severity generally allow a proportionate approach to be applied, in particular to differentiate between large aircraft and general aviation aircraft projects.

3.1. LoI determination at CDI level

The determination of the Agency's LoI is performed at the level of the CDI. On simple projects, e.g. involving only one discipline, it may be performed at the level of the project.

3.2. Method for determining the likelihood of an unidentified non-compliance

3.2.1. Principle

The likelihood of an unidentified non-compliance is assessed on the basis of the following criteria:

- novelty,
- complexity, and
- DOA performance.

3.2.2. Novelty

Whether or not a CDI is novel will be established based on the extent to which the respective elements of the certification project, the related requirement or means of compliance are new /novel to either industry, the applicant or from an EASA perspective.

The determination that a CDI is novel could be driven by the use of new technology, new operations, new kind of installations, the use of new requirements or the use of new means of compliance. When an applicant is utilising a technology for the first time, or when that applicant is relatively

unfamiliar with the technology, this is considered "novel", even if other applicants may be already familiar with that given technology.

Another consideration is the extent to which requirements, means of compliance or guidance need to be adapted due to particular novel features of the design. Examples include:

- Recently issued or amended CS paragraphs, for which the applicant has little or no experience;
- New special conditions;
- New equivalent safety findings;
- New deviations;
- New guidance or interpretative material;
- New means of compliance (i.e. other than previously applied by the applicant) or unusual means of compliance (different from existing guidance material and/or different from Industry standard practices);
- The use of new industry standards or new in house methodology and EASA's familiarity with these methods and standards;
- A change in methodology, tools or assumptions (compared to those previously applied by the Applicant), including changes in software tools/programs;
- Novelty in the interpretation of the results of the compliance demonstration.

Additional new guidance/interpretative material in the form of new Certification Memoranda may be considered for the determination of novelty in case its incorrect application/use may lead to an unidentified non-compliance. In this context, the time between the last similar and the current project of the applicant should also be considered.

Panel or discipline specific guidance is available in the attachments to this Certification Memorandum.

3.2.3. Complexity

For each CDI, the determination whether it is complex or not may vary based upon factors such as the design, technology or associated manufacturing process, compliance demonstration (including test set ups or analysis), interpretation of the results of the compliance demonstration, interfaces to other technical disciplines / CDI, and requirements.

The demonstration of compliance may be considered to be "complex" for a complex (or highly integrated) system, which typically requires more effort from the applicant.

A "complex" classification may result from a compliance demonstration for requirements that

- are of a subjective nature,
- require qualitative assessment, and
- do not have an explicit description of the means of compliance.

This is typically is the case where the requirement uses terms such as “subjective”, “qualitative”, “assessment” or “suitable” respectively “unsuitable”.

Whether a CDI is complex or not should be estimated in a conservative manner where it cannot be determined at an early stage of the certification project. At such time as greater clarity has been achieved, the complexity can be re-evaluated and the LoI can then be adapted.

Panel or discipline specific guidance is available in the attachments to this Certification Memorandum.

3.2.4. Performance of the Design Organisation

The assessment of the DOA performance will take into account the applicant’s experience with applicable certification processes, including their performance on previous projects and their degree of familiarity with the applicable certification requirements.

At the moment, the Agency only possesses relevant data to consider the design organisations expected performance at an organisational and panel level. This data stems from overall Design Organisation audits, measured performance of previous projects with the applicant and performance during the familiarisation phase. The ultimate objective is to define the organisations performance at the discipline level. The Agency shares this data with the respective design organisations (in form of the DOA dashboard).

The applicant may include in its LoI proposal information about its performance, which the Agency has shared with the design organisation. In case the Agency has not yet shared the data with the design organisation and the organisation is well established, the LoI proposal should assume a “medium” performance. In case the Agency has not yet shared the data with the design organisation due to the fact that the organisation is new, the LoI proposal should assume a “low” performance.

The Agency determines the organisations performance at an organisational, panel or discipline level, depending on the availability of sufficient data. When appropriate, the Agency can in addition take into consideration the overall performance of the organisation at organisational level.

Where the applicant has assumed a “medium” performance in the absence of any data shared, the Agency will adapt the proposal as necessary when reviewing the applicant’s proposal.

The determination of the performance of the design organisation may also take into consideration information which is more specific or more recent as compared to the DOA dashboard, e.g. experience gained during technical familiarisation with the current certification project, the performance of compliance verification engineers and the design team functions, as well as the performance of the design organisation in overseeing system/equipment suppliers.

3.2.5. Likelihood of an unidentified non-compliance

The likelihood of an unidentified non-compliance should not be confused with the likelihood of occurrence of an unsafe condition as per AMC 21A.3B(b). In fact, this part expresses the Agency’s

confidence level that the design organisation addresses all details of the certification basis for the concerned CDI and that no non-compliance will occur.

The likelihood of an unidentified non-compliance is established in four categories (very low, low, medium, high) depending on the performance of the design organisation, and on whether the CDI is novel or complex, as follows:

Step 1: Likelihood of an unidentified non-compliance			
CDI / performance of the organisation	no novel or complex aspects	no novel, but complex aspects ; novel, but no complex aspects	novel and complex aspects
High	Very low	Low	Medium
Medium	Low	Medium	High
Low or unknown	Medium	High	High

3.3. Severity

The severity determination is the result of an assessment of the potential impact of a non-compliance with part of the certification basis on airworthiness or environmental protection of the product.

Some of the below guidance have been derived from the GM 21.A.91, not for the reason of a major/minor change classification but because the same considerations can be applied in order to determine the effect of a non-compliance on airworthiness or environmental protection at CDI level. It is therefore normal that a major change which consists of several CDIs, some of those CDIs could be critical and some CDIs could be non-critical.

The severity for a CDI should be classified as critical for example if:

- a function is introduced or affected where a failure effect is classified hazardous or catastrophic at aircraft level, for instance for “equipment, systems and installations”, e.g. where applicable as defined in 2X.1309;
- the Human Machine Interface is affected (displays, approved procedures, controls, or alerts);
- airworthiness limitations or operating limitations are established or altered; or
- the CDI is affected by an existing AD, or affected by occurrence(s) potentially subject to an AD or by a Safety Information Bulletin.

A critical severity level of a CDI that is solely based on the criteria that it is affected by an airworthiness directive may be reclassified by EASA as non-critical due to the involvement of the Agency in the continued airworthiness process.

During the early stages of a project, the severity level in terms of potential safety consequence of failure may not always be known, but can often be conservatively estimated and the LoI subsequently re-evaluated if appropriate.

For further guidance or specific criteria on the severity of the consequences refer to the panel or discipline specific guidance attached to this Certification Memorandum.

3.4. Method for the determination of risk classes

The risk is described in a classical manner as a combination of the severity of the consequences of a non-compliance with part of the certification basis (vertical axis) and of its likelihood of occurrence (horizontal axis) using a matrix.

As a consequence, four qualitative risk classes are established (at CDI level):

Step 2: Risk classes				
Likelihood (see (Chapter 3.2.5) / Severity (see Chap. 3.3)	Very low	Low	Medium	High
Non-Critical	class 1	class 1	class 2	class 3
Critical	class 1	class 2	class 3	class 4

For the ease of application, a single table is provided in attachment 19, combining step 1 and step 2 above.

The various inputs and the resulting risk class determination are of a continuous nature rather than exhibiting discrete steps. The risk classes provide an order of magnitude of the Agency's involvement and are used as a basis for the determination of the Agency's involvement as described in paragraph 3.5.

Under specific circumstances, the risk class determined on the basis of the above criteria may be reduced or increased on the basis of justified and recorded arguments.

3.5. Determination of the Agency's involvement

The Agency's involvement in compliance demonstration verification shall be proposed by the applicant and determined by the Agency **in step 3: Determination of EASA involvement** on the basis of the qualitative risk class identified per CDI in step 2.

The involvement is reflected in a list of activities and data, in which the Agency retains the need for compliance demonstration verification (e.g. document review and acceptance, test witnessing, etc.). In addition, data may be identified as not being retained but kept for information if this data is necessary in order to prepare for the verification of data retained for compliance demonstration.

Depending on the risk classes determined in paragraph 3.4, the Agency's involvement in compliance demonstration verification activities could be as follows:

- Risk class 1: After agreement on the certification programme, no further involvement of the Agency in verifying compliance activities used by the applicant to demonstrate compliance at CDI level.

- Risk class 2: The involvement of the Agency typically is limited to the review[4] of a low number of compliance documents. No participation or participation to a low number of compliance activities (witnessing of tests, audit, etc.).
- Risk class 3: In addition to what is defined by class 2, the involvement of the Agency typically also comprises the review of additional compliance documents and the participation to some compliance activities (witnessing of tests, audit, etc.).
- Risk class 4: In addition to what is defined by class 3, the involvement of the Agency typically comprises the review of a high number of compliance documents and the participation to a high number of compliance activities (witnessing of tests, audit, etc.) and the acceptance of the detailed interpretation of test results.

Specific guidance per panel or discipline attached to this Certification Memorandum provides more information on typical compliance demonstration verification activities that will be retained and are associated with each risk class.

4. Documentation of LoI

The LoI proposal in the certification programme should include the proposed EASA retained compliance demonstration verification activities and data, as well as the data on which basis the LoI proposal has been made. For this purpose the applicant should appropriately document the analysis per CDI, considering the above criteria.

The Agency documents the LoI determination by its agreement to the certification programme, or where deviating from the proposal, by documentation of its analysis, considering the deviations from the proposal.

5. Sampling during DOA surveillance

It should be noted that all previously defined risk classes may be complemented by sampling of the project files during DOA surveillance, independently from the on-going certification project. This is necessary in order to maintain confidence in the DOA system and to constantly monitor its performance.

[4] The use of the word “review”, when used in the context of certification documents, implies that the Agency will provide confirmation of their acceptance. This does not exclude the possibility that other documents may be requested by the Agency when they are used to support the Agency’s understanding of the project. For these documents, no acceptance from the Agency should be expected.

6. Remarks

1. This EASA Proposed Certification Memorandum will be closed for public consultation on the **06th of March 2017**. Comments received after the indicated closing date for consultation might not be taken into account.
2. Comments regarding this EASA Proposed Certification Memorandum should be referred to the Certification Policy and Safety Information Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu.
3. For any question concerning the technical content of this EASA Proposed Certification Memorandum, please contact:

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Attachment 1

Additional Guidance for Flight Panel

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Flight Panel (Panel 1).

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
- Human Machine Interface and Cockpit integration.

The following activities require Flight Panel involvement in all cases:

- Flight Manual approvals (for those parts requiring EASA approval); and
- The classification of failure cases that affect handling qualities and performance.

B. Specific Definitions

None.

C. Specific aspects of novelty

The generic criteria provided in chapter 3.2.2 of the Certification Memorandum are considered to be sufficient.

D. Specific aspects of complexity

Any scenario based compliance demonstration originating from the Human Factors related design process (see G.3) is considered as a complex demonstration.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are sufficient.

F. Specific aspects of severity

The severity classification used for system failures is not well adapted to the Flight Panel disciplines. In the areas of handling qualities and minimum performance, the severity 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 CDI establishes or alters the aircraft performance;
(ii) The CDI establishes or alters the aircraft's flight envelope;
(iii) The CDI establishes or alters the handling qualities of the aircraft including the flight control functions (e.g., functional performance of flight control laws, gains) or the flight protection or flight crew alerting system;
(iv) The CDI affects the Human Factors domain, the Human Machine Interface or the potential for flight crew errors.

G. Specific aspects related to the involvement per risk class

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

G.1 Activities related to requirements of 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 subjective nature to establish compliance. This may be obvious where the Certification Specifications or 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 where 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 aircraft Performance Determination

The determination of the performance based on flight testing, agreed 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 Human Machine Interface and Human Factors related design process and tests

The design of HMI and the Human Factors design compliance process in accordance with CS 25.1302 (and similar equivalent Human Factors standard) is an iterative process. Potential Human Factors issues should be identified early in the project and requires the early involvement of the Agency 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 in a systematic exploration of the human-machine interfaces. It allows early identification of potential design issues and usually takes place at the early stages of the certification process.
- HF evaluation: This approach is not systematic and aims 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 a scope of activity as per the following table:

SCOPE OF ACTIVITY				
Risk class	Main Flight Panel Activities			
	HQ assessment	Performance determination	HMI evaluation	HF evaluation
class 1	No	No	No	No
class 2	Note 1	Note 1	No	Note 6
class 3	Note 2	Note 2	Note 4	Note 7
class 4	Note 3	Note 3	Note 5	Note 8

(*) In case of particularly simple projects carried out by adequate DOs, the Flight Panel may decide to reduce their LoI (e.g. only the review and the approval of the Flight Manual).

NOTES:

1. Flight test participation for Hand ling Qualities and Performance, risk class 2.
   The Flight Panel may 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,

essential test plans will be reviewed (e.g. the CFTP, CSTP), as well as an adequate presentation of 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, 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 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 the 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, essential test plans will be reviewed (e.g. the CFTP, CSTP) as well as reports or presentations to show test results and the final document summarizing the successful completion of all the activities as per CP.

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 presentations 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 CP 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 presentations of 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 associated means of compliance. The Flight Panel will participate to a selected number of HF flights and simulator evaluations. In addition, key compliance documents may be reviewed (e.g. test orders and adequate documents/presentations to show test results and the final document summarizing the successful completion of all the activities as per CP).

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

9. Flight Panel will usually not participate to 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 Data

A. Purpose and scope

A.1 Purpose

This attachment provides specific guidance for the determination of the Agency's level of involvement related to the OSD Flight Crew Data (Panel 2).

A.2 Scope

This attachment applies to the following operational evaluation activities within the OSD Flight Crew Data 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 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 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)
- Any other flight crew operational evaluation activity.

B. Specific Definitions

Handling characteristics	The manner in which the aircraft responds with respect to 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)	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 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

In addition to the generic criteria provided in chapter 3.2.2 of the Certification Memorandum, the following are examples (non-exhaustive) which are considered novel:

- new methods of training delivery,
- use of novel devices.

D. Specific aspects of complexity

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

- As mentioned in paragraph 3.2.3 of this CM, compliance demonstration for requirements of subjective nature may be considered as a complex demonstration. In particular T-tests, as described in CS-FCD, are scenario based compliance demonstrations which comprise pilot performance and checking.
- Crew workload assessments and high interrelationship of multiple systems (and their associated failure modes) impact complexity of the compliance demonstration.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are sufficient.

F. Specific aspects of severity

The severity for the OSD-FC domain resides with the correct and complete identification of aircraft specific OSD flight crew data for the compliance with provisions laid down in 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 potential safety consequences, incorrect, incomplete, or non-compliant OSD flight crew data may lead to inadequate flight crew training, checking or currency at operator level and to unsafe operation of the respective aircraft.

G. Specific aspects related to the involvement per risk class

As Certification Specifications for OSD Flight Crew Data are “process-based”, compliance demonstration is generally established through an operational evaluation process involving the Agency’s pilot judgement.
The OSD Flight Crew Panel will look at the specific activities necessary to establish compliance of a specific CDI. The following are the main activities:

G.1 Activities related to requirements of Subjective Nature

T-tests, as described in CS-FCD, require independent pilot judgment and 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 the Agency, based on the considerations in G.1, using test subjects and T tests as described in the CS-FCD. However, when evaluating a major change to the type certificate where 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 Data Panel maybe reduced according to the risk classes. In these cases, the following will apply:

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

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

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

Activities in OSD-FC, risk class 4: In addition to what is defined by risk class 3, the OSD Flight Crew Data 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 the Agency's level of involvement related to Structures (Panel 3).

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.),
- Static strength and proof of structure (analysis, supporting tests, special factors),
- Fatigue and damage tolerance,
- Aeroelasticity,
- Crashworthiness,
- Impact (e.g. bird strike),
- Rapid decompression,
- Materials and manufacturing processes.

B. Specific Definitions

None.

C. Specific aspects of novelty

In general, for within the scope of 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 are considered to be novel in terms of design and manufacturing:

- New materials in airframe or equipment, such as new metal alloys or composites;

- New combination of materials;
- New applications of new materials or combination 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 technology, such as open rotors (uncontained engine failure);
- New or unusual aircraft configurations, such as canards or blended wing designs;
- Novel airframe layout or structural configurations outside of the applicant’s previous experience;
- Unusual location of fuel tanks and/or amount 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;
- 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;
- 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 complex:

- Increasing complexity of structures or systems that include or affect structures,
- Difficulty of 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 involving 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,
- Interaction of system and structures (CS 25.302 and SCs for other applications),
- Difficulty of 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

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are sufficient.

F. Specific aspects of severity

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

A general assessment of the criticality for 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 critical aspects.
- Transmissions that utilise more generic criteria in some requirements. The rotorcraft critical parts plan can be used to identify components.
- The classification of structure varies in different in organisations, but the severity 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 design detail point according to e.g. CS 25.571. Outside of the system safety assessment, no hazardous, major or minor classification exists in the certification requirements for structure. It is recommended that all structure is assessed for its consequence of failure to ensure good design practice appropriate to the structures function and to facilitate the LoI process. For example primary structure not classified as contributing to catastrophic failure e.g. under 25.571 or structure 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, 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....)

- Materials and manufacturing processes.

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

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

G. Specific aspects related to the involvement per risk class

The generic information provided in chapters 3.4 and 3.5 of the Certification Memorandum is considered to be sufficient.

Attachment 4

Additional guidance for Hydromechanical Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Flight Controls and Hydromechanical Systems Panel 4.

A.2 Applicability / Disciplines

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

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

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides some examples which are considered novel:

- The extent to which the regulation must be adapted for particular features associated with novelty
- Knowledge management aspects, e.g. quality of Applicant’s lessons learned process
- 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 System (EABS), Electro-Hydraulic or Hydrostatic Actuator/Electro-Mechanical Actuator (EHA/EMA)
- New materials, for example new brake material
- New processes (e.g. 3D printing, additive layer manufacturing)
- New Flight Control or Hydromechanical (HM) system architecture compared to previous programmes

- New functions, e.g. new means to implement load alleviation in Flight Control System (FCS), “Smart” Autobrake Function, Runway Overrun Awareness & Avoidance System (ROAAS), brake pressure ramp-up
- Change of MOC, e.g. more use of simulation or similarity compared to previous projects, e.g., Hydraulic systems when no or minimum tests are planned.
- Increased hydraulic system pressure compared to previous experience (e.g. 5000 psi)
- Change to the means to cool the hydraulic fluid (e.g. fuel heat-exchanger).
- New engine type or technology
- New wing design, where there is a risk of interference
- Novel reconfiguration of systems following failure, e.g. Flight Control Law (FCL) degraded modes
- Novel pilot interface, e.g. active sidestick, touch screen controls.
- Remotely Piloted Air System/ Unmanned Air Vehicle (RPAS / UAV)
- Flight Envelope protection / Electronic Stability and Protection
- 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 Actuator/Electro-Mechanical Actuator (EHA/EMA)
- Brake by Wire Control Systems
- Antiskid Control
- Autobrake functions
- Electrically Actuated Braking System (EABS)
- Steer by Wire Control Systems
- Runway Overrun Awareness & Avoidance System (ROAAS)
- Thermal management of hydraulic systems
- Design of fuselage doors in pressurized areas
- Compliance demonstration by analysis replacing required tests
- Compliance demonstration by simulation
- Complexity of system– complex (or highly-integrated) system.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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 to Certification Specifications would be an unsafe condition at aircraft level. The potential consequences of a non-compliance would be severe for each CS provisions applicable to any of the following subjects. This list is not exhaustive.

- Criticality of system (in terms of potential safety consequence of system failure), which isnot always known at 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);
- Antiskid (as opposed to brake system without antiskid);
- 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;
- Indication 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 failure of system clutches and brakes;
- Interaction of system and structure for critical functions;
- External Loads Primary and Back up Quick Release System (PQRS/BQRS);
- Prevention of high-lift asymmetry / skew;
- Adverse experience, e.g. Trimmable Horizontal Stabiliser Actuator (THSA), rotorcraft servovalves, air data probes/inputs;
- Autopilot with higher authority;
- Number of rotorcraft critical parts;
- New inputs to MMEL for critical functions (could be a reason for a later change to LoI);
- Change to the environment or critical operating conditions.

G. Specific aspects related to the involvement per risk class

Class 1

No specificities.

Class 2

The involvement typically includes the review of the SFHA and a limited number of test plans/reports and/or analysis.
The certification summary and AFM(S).
The expected number of certification meetings is likely to be limited and there should be no or very limited witnessing of test or inspections.

Class 3

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

- The review of some key certification documents such as:
  - AFHA / (P)ASA / SFHA / (P)SSA
  - analysis (PRA, ZSA, …)
  - Flight Test Programme & Reports
- The witnessing of few selected tests
- The inspection of few selected aircraft systems
- 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 by risk class 3, the involvement comprises:

- The review of more certification documents
- The witnessing of most certification tests
- The inspection of selected aircraft systems
- 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 to the determination of the Agency's level of involvement related to Electrical Systems (Panel 5).

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)
- 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 are considered to be novel:

- **Electrical Generation / Distribution**
  - New materials in equipment (e.g. lithium battery),
  - New combinations of materials,
  - New electrical system architecture compared to previous programmes,
  - New functions,

- Novel electrical system configurations outside of applicant's previous experience,
- Increased electrical system voltage compared to previous experience,
- New engine type or technology (new electrical generation principle),
- New type of circuit breakers (e.g. Arc Fault Circuit Breakers).

- **EMC**
  - New standard used for EMC,
  - New materials used with less protective characteristics,
    More extensive use of numerical models for compliance demonstration instead of testing.

- **HIRF and Lightning Indirect Effects**
  - New materials used with less protective characteristics,
    More extensive use of numerical models for compliance demonstration instead of testing.

- **Lightning Direct Effects**
  - Use of new materials for fuselage or parts thereof with less protective characteristics towards lightning direct effects,
  - Use of new materials for fuel tanks or parts thereof, with less protective characteristics towards lightning direct effects.
    More extensive use of numerical models for compliance demonstration instead of testing.

- **EWIS**
  - Subpart H , specifically for new TC applications,
  - New technology used for EWIS components.

- **Lights**
  - New technology for the power supply of emergency lights, e.g. battery with new chemical,
  - 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**
  - Fly -by-wire flight control system that requires a continuous source of electrical power in order to keep the flight control system operable,
  - Use of composite material 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),
  - Distribution through complex management systems, possibly involving software.

- **EMC**
  - Integration of different functions with different levels of safety impact in one system.

- **HIRF and Lightning Indirect Effects**
  - Integration of different functions with different levels of safety impact in one system.

- **Lightning Direct Effects**
  - The use of composite material in fuel tanks that could require particular considerations for the fuel system protection, in relation to the ignition risk due to a lightning strike on the structure or accumulation of electrical charge,
  - Integration of different functions with different levels of safety impact in one system.

- **EWIS**
  - Monitoring of electronic circuit breakers in centralised systems,
  - Introduction of systems in EWIS zones that could negatively affect the EWIS components , e.g. introduction of hydraulic lines, fuel lines, water, oxygen, etc.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are sufficient.

F. Specific aspects of severity

The level of severity is also critical, when a failure related to the EWIS can result in hazardous or catastrophic effects at 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 the Agency's involvement per risk class:

- Class 1 No specificities.

- Class 2 The involvement of the EASA experts on the project is limited to:
  - the review of the system certification plans, certification summary and the AFM(S), and
  - the review of low number of compliance documentation

  Other specific documents may be requested. The number of certification meetings is likely to be limited and there should be no witnessing of test or inspections.
-

- Class 3: In addition to risk class 2, the involvement of the EASA experts comprises:
  - the review of key certification documents such as:
    - AFHA / (P)ASA / SFHA / (P)SSA (2x.1309 and 25.1709)
    - Important analysis (PRA, ZSA, ELA, …)
    - Important test plans and test reports
    - EWIS design and separation rules
  - The witnessing of some ground, simulator and/or bench certification tests and/or inspections may be performed, and
  - Audits on the development assurance process may be conducted at one or two stages of the process

  In addition to what is defined by risk class 2, the involvement also comprises the review of more compliance documents and the participation to some compliance activities (witnessing of tests, inspections, audit, etc.).

- Class 4: Compared to risk class 3, the involvement at risk class 4 is increased in terms of:
  - Review of a significantly higher amount of documents produced by the Applicant for showing compliance; for instance, design documents which the main compliance documents refer to and contain a higher level of detail.
  - Deeper involvement in witnessing of certification tests and agreement on the interpretation of test results.

Attachment 6

Additional guidance for Avionics Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Avionics Systems (Panel 6).

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 (which includes air data systems, datalink, transponder, radio, environment surveillance systems (TCAS, TAWS, Weather Radar …), flight management systems, etc.)
- Indicating, Alerting & Recording systems and Diagnostic and Maintenance systems (which 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)
- Cybersecurity

B. Specific Definitions

None.

C. Specific aspects of novelty

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

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

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

- New Requirements:
  - CS-ACNS
  - CS25.1322 Amendment 11 Flight Crew Alerting
  - Novel Special Conditions notified by a CRI (e.g. Cybersecurity).

- New means of compliance:
  - AMC 25-11 for Head Up and Weather Displays
  - AMC 25.1322 Flight Crew Alerting
  - Novel Interpretative Material notified by a CRI or application of Certification Memoranda (e.g. ROAAS, ADS-B In, etc.).

D. Specific aspects of complexity

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

- Complex design:
  - Integrated Modular Avionics (IMA) Systems
  - 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)
  - All Weather Operations.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The generic criteria provided in chapter 3.3 of the Certification Memorandum are considered to be sufficient.

G. Specific aspects related to the involvement per risk class

The LoI shall be determined as follows.

Class 1

No specificities.

Class 2

The involvement of the EASA experts on the project is limited to:

- the review of the system certification plans, certification summary and the AFM(S), and
- the review of a low number of compliance documentation.

Other specific documents may be requested. The expected number of certification meetings is likely to be limited and there should be no witnessing of test or inspections.

Class 3

In addition to risk class 2, the involvement of the EASA experts comprises of:

- the review of key certification documents such as:
  - AFHA / (P)ASA / SFHA / (P)SSA
  - Important analysis (PRA, ZSA, …)
  - Important test plans and test reports
  - Compliance demonstration to some applicable requirement, CRI and AMC,
- The witnessing of some ground, simulator and/or bench certification tests and/or 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 risk class 3, the involvement of the EASA experts comprises of the potential review of all the certification documents.
- The witnessing of 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 1:
Specific experience with equipment suppliers will also be taken into consideration in the determination of LoI.

NOTE 2:
In reference to chapter 2.1, the Avionics Panel considers Open Problem Reports (OPRs) as deviations from requirements. The assessment of the impact of OPRs may result in a change of the LoI.

Attachment 7

Additional guidance for Powerplant installation and Fuel Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of the Agency's level of involvement related to the Powerplant installation and Fuel Systems (Panel 7).

A.2 Applicability / Disciplines

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

- ATA26 Fire Protection (Unpressurized – non cabin areas)
- ATA28 Fuel System
- ATA47 Inerting System
- ATA49 APU installation
- ATA60 Propeller installation
- ATA70 Powerplant installation
- ETOPS
- Volcanic Ash.

B. Specific Definitions

None.

C. Specific aspects of novelty

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

Design:

- Introduction of a new fire threat (new fuel, hydrogen, high energy storage devices, batteries in Designated Fire Zones)
- New fire detection concept
- Halon-free fire extinguishing product
- New fire prevention principles
- New fire protection material and principles
- New energy supply (e.g. new fuel, hydrogen, electric …)
- Unusual location or construction of fuel tanks
- Novelty affecting fuel tank safety precautions and concept (all composite fuel tank, explosion withstanding capability)

- Unusual location of engine/APU/Propeller
- First introduction by the applicant of a multi-engine configuration
- First introduction by the applicant of a turbine engine
- First introduction by the applicant of an electronically controlled engine
- Aspects identified at Propeller unit, APU unit or Engine unit affecting the Propeller/APU/Engine installation rules at aircraft level (open rotor, electrical engine, hybrid engine, engine complex lubricating system, new engine material, aircraft functions implemented on or shared with engine/APU/Propeller, new engine fuel filtering concept…)
- New propulsion thrust/power/torque ratings
- New engine/propeller/APU threats and failure modes
- New propulsion thrust/power/torque generation and management concept (including multi-engines logics, vectore thrust, use of thrust reverser in-flight, …)
- Temporary use of propulsion thrust/power/torque generation
- Tilt Rotors
- UAV.

Operation:

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

Requirement:

- Whether a key or sensitive requirement or AMC is invoked that is still not fully accepted/understood or had been controversial, e.g. Cowling latch, APU door compliance, 2D Nacelle area, fire size assumption. This includes Certification Specifications for which Generic CRIs exist.

Compliance Demonstration

- New Propeller/APU/Engine certification assumptions not in line with aircraft certification assumptions
- Aircraft system/part/equipment certified with engine/APU/Propeller
- Fuel tank crashworthiness (CS 27.952/CS29.952) demonstrated by analysis and/or partial drop test
- Credit of containment capability assumptions (UERF for APU/Engine))
- Use of simulation tools (fire, thermal, water ingestion, 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 function (autothrust, autothrottle, remote control, Thrust Control Malfunction function)
- Engine/APU/Propeller interfaces with aircraft including multi engines logics
- In-flight BETA/ reverse thrust prevention function
- Aircraft functions embedded into engine components
- Use of composite materials.

Compliance demonstration:

- Difficulty in the definition of test specimen
- Compliance demonstration by flight test for in-flight restart or cooling or engine electronic control fault evaluation
- Compliance demonstration by analysis replacing required tests
- Fire size characterization and fire test result interpretation
- Fuel tank crashworthiness
- Fuel tank flammability and ignition prevention compliance demonstration
- Compliance demonstration by simulation.

Interfaces:

- Demonstration of validity of Engine/APU/Propeller certification data for re-use in aircraft compliance
- Fire risk (multi ATA chapter implication)
- UERF for APU/Engine / Propeller debris release compliance demonstration (multi ATA chapter implication,)
- Sustained Engine Imbalance (SEI) (multi ATA chapter implication)
- ETOPS (multi ATA chapter implication, use of engine data)
- Volcanic Ash (multi ATA chapter implication, use of engine data).

Requirements:

- Applicability of Fuel Tank Safety Rules (CS 25.981).

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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

- Risk of fire
- Uncontrolled or temporary uncontrolled fire
- Fuel tank overpressure / explosion
- Fuel quantity and leak management
- Ability to maintain aircraft attitude (e.g., fuel balancing)

- Fuel release overboard and fuel tank crashworthiness
- Protection of occupants (e.g. crashworthiness, wheels up landing)
- Independence between engines and engine fuel supply
- Common cause affecting the aircraft propulsion (e.g. icing, fuel contamination, software/hardware development, …)
- Release of debris (APU, Engine and Propeller)
- Loss of thrust/power/torque
- Thrust/torque/propeller control malfunction
- Inadvertent reverse thrust/Beta mode
- Opening of engine/nacelle cowls, APU doors in flight
- Detachment of engine/nacelle/APU/propeller
- Ability to conduct safe flight and landing under SEI, UERF, Propeller debris release
- Ability to conduct safe flight and landing after partial/complete loss of propulsion
- Evidence of potential single failures and common mode failures/errors for critical functions, e.g., single failure for thrust control malfunction accommodation, single failure leading to fuel tank explosion, single failure and latent failure contributions to in-flight thrust reverser deployment, …
- Adverse previous experience
- Change to environment or critical operating conditions.

G. Specific aspects related to the involvement per risk class

Class 1

No specificities.

Class 2

The involvement typically includes the review of:

- The SFHA and a limited number of test plans/reports and/or analysis;
- The certification summary 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 test or inspections.

Class 3

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

- The review of some key certification documents such as:
  - AFHA / (P)ASA / SFHA / (P)SSA
  - analysis (PRA, ZSA, UERF, …)
  - Flight Test Program & Report
- The witnessing of a few selected tests
- The inspection of few selected aircraft systems
- 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 by risk class 3, the involvement comprises of:

- The review of more certification documents
- The witnessing of most certification tests
- The inspection of selected aircraft systems
- Audits on the development assurance process may be conducted at more stages of the process.

Attachment 8

Additional guidance for Icing and Environmental Control Systems

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Icing and Environmental Control Systems (Panel 8).

A.2 Applicability / Disciplines

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

- Bleed Air, (ATA 36)
- Air Conditioning & Pressurisation, (ATA 21)
- Ice Protection, (ATA 30)
- Oxygen, (ATA 35)
- Water& Waste (ATA 38).

B. Specific Definitions

None.

C. Specific aspects of novelty

The generic criteria provided in chapter 3.2.2 of the Certification Memorandum are considered to be sufficient.

D. Specific aspects of complexity

The generic criteria provided in chapter 3.2.3 of the Certification Memorandum are considered to be sufficient.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The generic criteria provided in chapter 3.3 of the Certification Memorandum are considered to be sufficient.

G. Specific aspects related to the involvement per risk class

Class 1

No specificities.

Class 2

The involvement typically includes the review of:

- The SFHA and a limited number of test plans/reports and/or analysis;
- The certification summary 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 test or inspections.

Class 3

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

- The review of some key certification documents such as:
  - AFHA / (P)ASA / SFHA / (P)SSA
  - Analyses (PRA, ZSA, …)
  - Flight Test Program & Report
- The witnessing of a few selected tests
- The inspection of a few selected aircraft systems
- 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 by risk class 3, the involvement comprises of:

- The review of more certification documents
- The witnessing of most certification tests
- The inspection of selected aircraft systems
- Audits on the development assurance process may be conducted at more stage of the process.

Attachment 9

Additional guidance for aircraft noise and aircraft engine emissions experts

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of the Agency's level of involvement related to environmental protection (Panel 9).

A.2 Applicability / Disciplines

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

- aircraft noise
- engine emissions
- the prevention of intentional fuel venting.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which are 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 measured noise/emissions levels to reference conditions (including new or novel hardware and equivalent procedures).
- New organisations conducting the tests.

D. Specific aspects of complexity

Complexity may refer to specific design features of the product intended to mitigate noise, fuel venting or emissions, and 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, installation of new or changed engines and/or propellers, muffler installations
- Equivalent procedures 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
- Use of aircraft noise “family plan” methodologies
- Use of operating procedures (e.g. landing flap restrictions) to ensure compliance with noise requirements.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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

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

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

Points (a) and (b) concern the potential for the aircraft and its operation to have a significant impact the environment and 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 the Agency's involvement per risk class

The involvement for each risk class is as follows:

Class 1

No specificities.

Class 2

The involvement of the EASA experts on the project is limited to a review of a limited number of compliance documents. The expected number of meetings dedicated to noise or emissions certification is likely to be very few. There will be no, or very limited, witnessing of tests or inspections.

Class 3

The involvement of the EASA experts comprises of:

- Review of certification summary
  - Review of the selected certification documents related to:
    - Flight or static test programme and reports
    - Data acquisition (including novel hardware) and adjustment procedures (including data adjustment software)
  - Witnessing of a limited number of tests (or none)
  - Possible review and auditing of data acquisition and data adjustment procedures.

Class 4

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

- Review of the majority of certification documents,
- Witnessing of most, if not all, 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 to the determination of the Agency's level of involvement related to Software and Airborne Electronic Hardware (Panel 10).

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.
- Development Assurance related to Airborne Electronic Hardware (AEH) within equipment and systems.

The DOA performance 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. ATA chapter).

B. Specific Definitions

None.

C. Specific aspects of novelty

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

Design:

- New or modified development techniques for Software or Airborne Electronic Hardware
- 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 subcontractor or innovation in the industrial work share.

D. Specific aspects of complexity

In the context of SW 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 (SW 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 into the same hardware device
- Complex architecture (e.g. Integrated Modular Avionics (IMA)) intended to support several aircraft functions
- Introduction of a complex work-sharing with 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.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The different SW or AEH design assurance levels map as follows with the severity classes listed in 3.3 of the CM:

- Critical : DAL A or DAL B
- Non-Critical: DAL C or DAL D.

G. Specific aspects related to the involvement per risk class

The table from 3.4 of this CM is adapted in the following way:

Step 2: Risk classes

Likelihood (see Chap. 3.2.5) / Severity (see Chap. 3.3)	Very low	Low	Medium	High
Non-Critical - DAL D	Class 1	Class 1	Class 1	Class 2
Non-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

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

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

Attachment 11

Additional guidance for Cabin safety

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to Cabin Safety (Panel 11).

A.2 Applicability / Disciplines

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

- Occupant crashworthiness/restraint
- Rotorcraft External Human and Cargo Restraint
- Emergency means and evacuation (including emergency lighting, emergency exits, emergency equipment, slides, ditching, etc.)
- Fire protection - pressurised areas
- Security aspects
- Cabin Installation (including Emergency Medical Systems, VIP interiors, Crew Rest Compartments, Courier Compartments, etc.)
- Cargo compartments
- Internal and External placards and markings.

B. Specific Definitions

None.

C. Specific aspects of novelty

The criteria provided in chapter 3.2.2 of the Certification Memorandum are sufficient.

D. Specific aspects of complexity

The generic criteria provided in chapter 3.2.3 of the Certification Memorandum are considered to be sufficient.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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

Aspects of severity 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 hidden area	Undetected or inaccessible in-flight fire leading to injuries and/or fatalities
	Flame burnthrough in post-crash fire event	Fire entry in cabin before/during evacuation leading to injuries and/or fatalities
	Inadequate performance of fire fighting 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

Class 1

No specificities.

Class 2

The involvement of the EASA experts on the project is limited to the review of a low number of certification documents and may include a cabin inspection in the case of cabin interior modifications. The expected number of certification meetings is limited and there should be no or very limited witnessing of test or inspections.

Class 3

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

- The review of certification documents such as:
  - AFHA / (P)ASA / SFHA / (P)SSA
  - Dedicated analyses (PRA, ZSA, …)
  - Dedicated Flight Test Program & Report
  - Other specific documents may be requested
- The witnessing of a few selected tests
- The inspection of a few selected aircraft systems
- The inspection of the interior
- An increased number of certification meetings.

Class 4

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

Attachment 12

Additional guidance for the Development Assurance and Safety Assessment

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Development Assurance and Safety Assessment panel (Panel 12).

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 specific to the disciplines of the Development Assurance and Safety Assessment. Some novelties that are identified may be specific to one particular type of product (e.g. Large Aeroplane, 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 XX.1309 and associated AMC (e.g. development assurance aspects)	– Significant change in the applicable XX.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

		Development Assurance (DA)	Safety Assessment (SA)
			– First application of an FAA policy statement (e.g. runway excursion classification) in case the compliance finding is delegated to EASA
	Means of compliance	– Use of a new requirement management tool – Use of criteria to limit the applicability scope of Development Assurance aspects for certification	– 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 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 with system / equipment suppliers	- Introduction of a complex work-sharing with system / equipment suppliers

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The following list of critical/non-critical products specific to 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)
Critical	- CS-23 commuter, CS-25, CS-29, RPAS or any other complex innovative products, - related significant changes, - 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	- CS-23 commuter, CS-25, CS-29, RPAS or any other complex innovative products, - related significant changes, - 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

Class 1

No specificities.

Class 2

The involvement is limited to the review of the Development Assurance Plan and the Safety Program Plan.

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

Class 3

Additionally to the activities described for risk class 2 the involvement comprises of:
- the review of the certification summary related to DASA activities, and
- the review of key certification documents such as AFHA, PASA, ASA.

Any other specific documents, supporting the review and acceptance of the above referenced documents, may be additionally requested.

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

Attachment 13

Additional guidance for Transmission

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance for the determination of the Agency's level involvement related to Transmission (Panel 13).

A.2 Applicability

The attachment applies to rotorcraft Transmissions Panel.

B. Specific Definitions

None.

C. Specific aspects of novelty

The following list (not exhaustive) provides examples which are considered novel design and manufacturing:

- New materials, like new metal alloys or composites;
- New combinations of materials;
- New applications for materials or combinations of materials (composites “tailored” to designs);
- New manufacturing processes, like additive manufacturing or laser welding;
- New use of Electronic Flight Control Systems;
- New engine technology;
- Changes to the configuration of the drive system or lubrication system;
- VHM, SHM, new NDI;
- New or unusual rotorcraft configurations.

Operation:

- New, unusual or changes in operations.

Requirements:

- Whether a key or sensitive Certification Specification or AMC is invoked that is still not fully accepted/understood (e.g. 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 of evaluating the links between degradation and critical failure,
- Difficulty in the classification of the hazard severity of failure modes identified in failure analyses,
- Emergency procedures written into the RFM and associated assumptions made regarding pilot performance,
- Difficulty of 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

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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

Furthermore, the following provision 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, 29.1529 ICA.

G. Specific aspects related to the involvement per risk class

The generic information provided in chapters 3.4 and 3.5 of the Certification Memorandum is considered to be sufficient.

Attachment 14

Additional guidance for OSD Maintenance Certifying Staff Panel

A. Purpose and Applicability

A1. Purpose

This attachment provides specific guidance to the determination of the Agency's level involvement related to the Operational Suitability Data for Maintenance Certifying Staff (Panel 14).

A2. Applicability

This attachment applies to OSD for Maintenance Certifying Staff Panel.

B. Specific Definitions

Maintenance Areas of Specific Emphasis (MASE)	Any element considered by the applicant being novel or not, specificity or uniqueness relevant to the maintenance of his product. This could be a technical or operational feature that maintenance personnel need to be aware of and take into consideration

C. Specific aspects of novelty

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

- Tilt rotor aircraft;
- New aircraft systems architecture;
- Unconventional design: e.g. systems actuation by electrical power, including EABS (Electrically Actuated Braking System), EHA/EMA (Electro-Hydraulic Actuator/Electro-Mechanical Actuator).
- New engine technology: 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;
- Unusual format of the maintenance instructions.

D. Specific aspects of complexity

The generic criteria provided in chapter 3.2.3 of the Certification Memorandum are considered to be sufficient.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of Severity

The severity for the OSD-MCS domain resides in the correct and complete identification of aircraft specific configuration, established through OSD-MCS for the compliance with 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 inadequate MCS training effectiveness at training organization level, and eventually to unsafe MCS maintenance on the respective aircraft type or variant. The severity can be specific to one or more items contained by the following generic categories of information, which constitute the content of the MCS type specific data:

- Aircraft classification (Group 1 or not).
- Aircraft configuration (relevant to maintenance type training).
- Type rating determination (grouping variants in the same type rating).
- MCS training (e.g. content of training syllabus; identification of MASE).
- MCS qualifications (e.g. trainee's prerequisites).

G. Specific aspects related to the involvement per risk class

The activities within each of the risk classes are:

Activities in OSD-MCS risk class 1

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

Activities in OSD-MCS risk class 2

In addition to what is defined by risk class 1:

- Review of the justification documents (approach and methodology used by the Applicant).

Activities in OSD-MCS risk class 3

In addition to what is defined by risk class 2:

- Sampling review of the minimum syllabus (deliverable documents for end-users).

Activities in OSD-MCS risk class 4

In addition to what is defined by risk class 3:

- Complete review of the minimum syllabus (deliverable documents for end-users);
  On-site audit relevant to verify, at aircraft level and the MASE.

Attachment 15

Additional guidance for OSD-MMEL

A. Purpose and Applicability

A. Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Operational Suitability Data for MMEL (Panel 15).

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.

Should the level of new/modified justification methods be considerable or the knowledge of the original justification methods be 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 as not being novel when it only requires transposing existing compliance documents of already approved MMEL items to the new/modified type design configuration or using EASA CS-MMEL guidance material.
For example, the introduction of a new air conditioning pack on a new aircraft type may be relying, as far as MMEL justifications are concerned, on previously agreed considerations and subsequent limitations. This item may therefore be considered as not being novel for MMEL (it may however be retained as being novel for the certification of the type design).

D. Specific aspects of Complexity

Although the performance of a quantitative analysis is not complex per se, a MMEL CDI with complex aspects will typically be an item for which the analysis of the consequence 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 covered, the high interrelationship level with other aircraft systems or the elaborated mitigations means 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 crew workload or existing procedures and which do not necessitate mitigations means to ensure acceptable level of safety is maintained (GO items) are considered as not complex.
If dispatch conditions or procedures are only introduced based on a conservative approach, the associated items may still be considered as not being complex.

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

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of Severity

Items 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 considered to be not acceptable, mitigation means are proposed to ensure an acceptable level of safety is maintained for the candidate items.
The severity of an unidentified non-compliance may be critical if the proposed mitigations means 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 aircraft level, or
- not covered by the crew procedures, airworthiness or operating limitations applicable to the full-up configuration.

The severity of an unidentified non-compliance is also considered as being critical, when compliance demonstration for MMEL includes a quantitative assessment as per CS-MMEL 145 (d) or similar means of compliance. . Furthermore, whilst conducting continuing airworthiness oversight activities evidence of any aspect that has a potential impact on MMEL may lead the Agency to reinforce its LoI on specific related projects.

G. Specific aspects related to the involvement per risk class

The activities within each of the risk classes are:

Activities in OSD-MMEL risk class 1

The activities are the following:

- no specificities.

Activities in OSD-MMEL risk class 2

The activities are the following:

- review of certification summary.

Activities in OSD-MMEL risk class 3

The activities are the following, in addition to those defined by risk class 2:

- Review of compliance documents (MMEL justifications) sent by the applicant for information without the need for MMEL panel acceptance;
- Investigation meetings involving, where necessary, coordination with other Panels experts.

Activities in OSD-MMEL risk class 4

The activities are the following, in addition to those defined by risk class 3:

- Review of potentially all of the MMEL related compliance documents.

Attachment 16

Additional Guidance for OSD Simulator Data

A. Purpose and Applicability

A. Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the Operational Suitability Data for flight simulators (Panel 16).

A2. Applicability

This attachment applies to the OSD-SIMD Panel.

B. Specific Definitions

None.

C. Specific aspects of novelty

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

- New design features on the aircraft (e.g. HUD installation; avionics features; option for a different engine type; revision levels affecting handling qualities and performance);
- Additional functionality on the aircraft or aircraft operation requiring additional validation of 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);
- Extension of the training envelope requiring new validation source data or the scope thereof (e.g. UPRT, stall training).

D. Specific aspects of complexity

The generic criteria provided in chapter 3.2.3 of the Certification Memorandum are considered to be sufficient.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The severity for the OSD SIM domain resides with the correct and complete provision of scope of 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 potential safety consequences, 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 non-qualifiable FFS/FTD, which could eventually lead to negative training of flight crews or to inconsistencies between devices replicating the same type of aircraft. The severity can be identified as being specific to one or more items contained in the following generic categories of information, which constitute the FFS/FTD's type specific validation data:

- 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 (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

The activities within each of the risk classes are:

Activities in OSD-SIM risk class 1

No specificities.

Activities in OSD-SIM risk class 2

The activities are the following:

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

Activities in OSD-SIM risk class 3

The activities are the following:

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

Activities in OSD-SIM risk class 4

The activities are the following:

- Review of the applicant's plan to provide the required validation source data including all methods and sources used.
- On-site audit of engineering simulator/simulation and associated processes and programmes to selectively supplement flight test data.
- Review and acceptance of the validation data roadmap (VDR).
- Joint full review of compliance documents with the Applicant.
- On-site audit at 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 Data

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to the OSD Cabin Crew Data (CCD) (Panel 17).

A.2 Applicability

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

- Aircraft classification i.e. as “new type” or “variant” for the purpose of cabin crew training and operation)
- 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 are considered to be novel:

- New procedures,
- New tasks or roles,
- The use of specific technology, which require unusual cabin crew knowledge, skills or training means.

D. Specific aspects of complexity

As mentioned in paragraph 3.2.3 of this CM, compliance demonstration for requirements of a subjective nature may be considered as a being complex demonstration. In particular, this applies to scenario based compliance demonstrations to determine type specific data associated with the respective aircraft type or variant.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

The severity for the OSD-CC domain resides with the correct and complete identification of aircraft specific OSD cabin crew data for the compliance with the provisions laid down in Air Operations regulations with regard to specific aircraft types and variants, established in order to support end-users (e.g. operators).

In terms of 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 operation 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 Agency 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 Data Panel are determined according to the risk classes. In these cases, the following will apply:

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

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

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

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

Attachment 18

Additional guidance for Propulsion

A. Purpose and Applicability

A.1 Purpose

This attachment provides specific guidance to the determination of the Agency's level of involvement related to Propulsion (Panel 18).

A.2 Applicability

This attachment applies to the following Products:

- Engines
- Propellers
- APUs

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 parts of the product, selected by the applicant as bearing commonality for the purpose of compliance demonstration to one (or several) requirement(s). It may (but not necessarily) form a meaningful group of parts for the purpose of assembly or function within the product.
Summary Compliance Documents	Summary compliance documents, also called “high level” or “level one” documents, generally contains 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 on test results, include assumptions and detailed steps and results of analysis, etc.

C. Specific aspects of novelty

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

- Novelty in the design or technology, such as, but not limited to:
  - Novel design of a part.
  - Novel material, manufacturing or assembly process.
  - Novel arrangement or architecture of a group of parts, of a sub-system, or of the whole product.
  - Novel interface or 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.
  - 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

The generic criteria provided in chapter 3.2.3 of the Certification Memorandum are considered to be sufficient.

E. Specific aspects of the performance of the Design Organisation

The generic criteria provided in chapter 3.2.4 of the Certification Memorandum are considered to be sufficient.

F. Specific aspects of severity

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 severity.

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

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

G. Specific aspects related to the involvement per risk class

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

- Class 1: No specificities.
- Class 2: The involvement of the Agency typically is limited to the review of a low number of compliance documents. If applicable, this could also mean a review of "summary" compliance documents only.
  No participation or participation to a very low number of compliance activities (witnessing of tests, audit, etc.).
- Class 3: In addition to what is defined by risk class 2, the involvement of the Agency typically also comprises the review of more compliance documents. If applicable, this could also mean, a review of a selection of "lower level" compliance documents.
  The participation to some compliance activities (witnessing of tests, audit, etc.).
- Class 4: In addition to what is defined by risk class 3, the involvement of the Agency typically comprises the review of a high number of compliance documents. If applicable, this could also mean, a review of a high number of "lower level" compliance documents.
  The participation to a high number of compliance activities (witnessing of tests, audit, etc.) and the participation in 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 the Agency on a higher LoI in order to facilitate discussions with the VA.

Attachment 19

Determination Risk classes

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

Attachment 20

Abbreviations

ADS-B	Automatic Dependent Surveillance - Broadcast
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
AML	Aircraft Maintenance Licence
ARP	Aerospace Recommended Practice
ASA	Aircraft Safety Assessment
BQRS	Back up Quick Release System
BTP	Bench / Laboratory Test Program
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
CVE	Compliance Verification Engineer
DAL	Design assurance level

DASA	Development Assurance and Safety Assessment
DDP	Declaration of Design and Performance
DO	Design Organisation
DOA	Design Organisation Approval
EABS	Electrically Actuated Braking System
ECL	Electronic Checklist
EHA	Electro-Hydraulic Actuator / Electro-Hydrostatic Actuator
ELA	Electronic Load Analysis
EMA	Electro-Mechanical Actuator
EMC	Electromagnetic Compatibility
ESF	Equivalent Safety Finding
EP	Environmental Protection (aircraft noise, aircraft engine emissions, the prevention of intentional fuel venting)
EVS	Enhanced Vision System
EWIS	Electrical Wiring and Interconnection System
EZAP	Enhanced Zonal Analysis Procedure
FAA	Federal Aviation Administration
FCD	Flight Crew Data
FCL	Flight Crew License
FCS	Flight Control System
FFS	Full Flight Simulator
F/IDAL	Function / Item Design Assurance Level
FHA	Functional Hazard Assessment
FM	Flight Manual
FSTD	Flight Simulation Training Device
FTE	Flight Test Engineer

FTP	Flight Test Pilot
FTP	Flight Test Program
GM	Guidance Material
GTP	Ground Test Program
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
ICA	Instructions for Continuing Airworthiness
IMA	Integrated modular avionics
LoI	Level of Involvement
MASE	Maintenance Areas of Specific Emphasis
MBSA	Model-Based Safety Assessment
MCS	Maintenance Certifying Staff
MCSD	Maintenance Certifying Staff Data
MLW	Maximum Landing Weight
MMEL	Master Minimum Equipment List
MoC	Means of Compliance
MRBR	Maintenance Review Board Report
MS	Minimum Syllabus

MSTD	Maintenance Simulation Training Device
MTOW	Maximum Take Off Weight
NAA	National Aviation Authority
NDI	Non-destructive Inspection
NDT	Non Destructive Testing
OPR	Open Problem Report
OSD	Operational Suitability Data
PASA	Preliminary Aircraft Safety Assessment
PCM	Project Certification Manager
PHAC	Plan for hardware aspects of certification
PQRS	Primary Quick Release System
PRA	Particular Risk Analysis
PSAC	Plan for software aspects of certification
PSSA	Preliminary System Safety Assessment
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
SFHA	System Functional Hazard Assessment
SHM	Structural health Monitoring

SIM	Simulator
SIMD	Simulator Data
SSA	System Safety Analysis
STC	Supplementary Type Certificate
STP	Simulator Test Programme
S/V NRS	Selectable/Variable Noise Reduction Systems
SVS	Synthetic Vision Systems
SW	Software
TASE	Training Areas of Special Emphasis
TC	Type Certificate
THSA	Trimmable Horizontal Stabiliser Actuator
TR	Type Rating
UAV	Unmanned Aircraft System
UERF	Uncontained Engine Rotor Failure
UPRT	Upset Prevention and Recovery Training
VDR	Validation Data Roadmap
VHM	Vehicle Health Monitoring
VIP	Very Important Person
ZSA	Zonal Safety Analysis