European Aviation Safety Agency — Rulemaking Directorate

Opinion No 07/2013

FLIGHT TESTING

RELATED CRD 2008-20 — MDM.003A — 22/08/2013

EXECUTIVE SUMMARY

This Opinion addresses flight test safety improvement issues with the specific objective to focus on defining and harmonising the flight test crew qualifications and achieve a smooth transition to the introduced requirements. This opinion proposes the introduction of a flight test operations manual defining the organisation's policies and procedures in relation to flight test.

Additionally, Part 21 is proposed to be amended to include a new Appendix XII applicable for CS-23 aircraft with a MTOM above 2 000 kg, and all CS-25, CS-27 and CS-29 aircraft. This appendix focuses on the following topics:

1. Definition of flight tests.
2. Flight test categories.
3. Qualification of pilots for flight testing categories 3 and 4.
4. Definition and qualification for lead flight test engineer.

The entry into force proposes grandfather rules as well as transitional measures to support further potential work on the topic of licensing for lead flight test engineer (LFTE). A separate A-NPA gathers additional data and information and will open the discussion on the creation of a licensing scheme for what is defined as an LFTE.

This Opinion will be followed by a Decision introducing AMCs and GMs to Part 21 to provide further guidance on the subjects addressed within this document.

Applicability	
Affected regulations and decisions:	Commission Regulation (EU) No 748/2012
Affected stakeholders:	All DOAs/POAs/APDOAs, Flight test crews for CS-23 above 2 000 kg, CS-25, CS-27, CS-29 aircraft, Member States, Flight test training organisations, Professional associations.
Driver/origin:	Harmonisation, Safety
Reference:	N/A

Process map	
Concept Paper:	No
Rulemaking group:	Yes
Terms of Reference	08/12/2004
RIA type:	Full
Technical consultation during NPA drafting:	Yes
Publication date of the NPA:	2008/03
Duration of NPA consultation:	5 months
Review group:	Yes
Focussed consultation:	No
Publication date of the Decision:	2014/03

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1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this Opinion in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's Rulemaking Programme for 2013 under MDM.003a. The scope and timescale of the task were defined in the related Terms of Reference (ToR) MDM.003(a)[3].

The draft text of this Opinion has been developed by the Agency based on the input of the Rulemaking Group for MDM.003. All interested parties were consulted[4] through the Notice of Proposed Amendment (NPA) 2008-20[5] which was published on 29/08/2008.

By the closing date of 31/01/2009, the Agency received 315 distinct comments from interested parties including industry, national aviation authorities, training providers, and professional organisations.

The Agency addressed and responded to the comments received on the NPA. The comments received and the Agency's responses were presented in the Comment-Response Document (CRD) 2008-20[6] that was published on 13/09/2012.

By the closing date of 13/11/2012, the Agency received 11 reactions on the CRD from interested parties including industry, national aviation authorities and professional organisations.

The text of this Opinion (i.e. Explanatory Note and draft regulation) has been developed by the Agency taking into account the reactions on the CRD.

The process map on the title page summarises the major milestones of this rulemaking activity.

1.2. The structure of this Opinion and related documents

Chapter 1 of this Opinion contains the procedural information related to this task. Chapter 2' Explanatory Note' explains the core technical content. The draft rule text proposed by the Agency is published on the Agency's website[7]. Chapter 3 summarises the related future ED Decisions on AMC/GM.

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1 Regulation (EC) No 216/2008 of the European Parliament and the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1), as last amended by Commission Regulation (EU) No 6/2013 of 8 January 2013 (OJ L 4, 9.1.2013, p. 34).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material (Rulemaking Procedure), EASA MB Decision No 01-2012 of 13 March 2012.

3 http://easa.europa.eu/rulemaking/docs/tor/mdm/EASA-ToR-MDM.003(a)-02-11012010.pdf.

4 In accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

5 http://easa.europa.eu/rulemaking/docs/npa/2008/NPA%202008-20.pdf.

6 http://easa.europa.eu/rulemaking/docs/crd/2012/CRD%202008-20.pdf.

7 http://easa.europa.eu/agency-measures/opinions.php.

1.3. The next steps in the procedure

This Opinion contains proposed changes to the Part 21 regulation and is addressed to the European Commission, which uses it as a technical basis to prepare a legislative proposal.

The Decision containing the Acceptable Means of Compliance (AMC) and Guidance Material (GM) will be published by the Agency once the changes to the Part 21 regulation are adopted.

2. Explanatory Note

2.1. Issues to be addressed

This Opinion addresses the need to harmonise flight test crew qualifications in Europe, in response to a request from the industry. The industry experienced a number of cases where test crews qualified in a country were not necessarily recognised in other countries.

Therefore, it was acknowledged that the free circulation of persons (flight test crews) and services (flight testing activities) must be improved.

Another issue to be addressed was the need for production and design organisations conducting flight test to define in a document the policies and procedures in relation with flight test. This document would be approved by the competent authority for the organisation (which may be a national authority or the Agency).

This task originates from previous JAA effort; however, it takes into account the Agency's current regulatory framework.

2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in 2.1.

The overall objectives of this proposal are to ensure that requirements are in place to allow for flight testing being conducted safely by providing harmonised requirements for crew qualifications, specifying a manual for flight test operations and providing an adequate transition period and grandfathering measures.

The specific objectives are:

(a) Introduction of the requirement for a flight test operations manual (FTOM), where the policies and procedures in relation to flight test are defined. The FTOM will include a link to the harmonised flight crew qualifications.

(b) Harmonisation of flight crew qualifications by taking the following steps:

(1) Provide a definition for flight tests;

(2) Define flight test categories;

(3) establish the necessary qualifications for pilots for flight testing categories 3 and 4; and

(4) Provide a definition for lead flight test engineer (LFTE) and detail the necessary qualifications.

(c) Transitional measures

Introduce grandfather rules for flight crew members already performing affected functions as well as transitional measures to support further work and a decision on the topic of LFTE licence.

A separate A-NPA gathers additional data and information and will open the discussion on the creation of a licensing scheme for LFTE. If the outcome of the A-NPA consultation is a decision to proceed with the LFTE licence, a new rulemaking task will be dedicated to this subject.

2.3. Outcome of the consultation

NPA 2008-20 generated comments on various topics regarding the applicability of Appendix XII, the FTOM, the definitions of flight test categories and of LFTE, and the experience and competence requirements for pilots and LFTE. Answers were provided via the CRD 2008-20. A revised text taking into account the comments has been proposed.

Few reactions were raised requesting clarification on the Appendix XII applicability, flight test categories, modification of the proposed competency requirements for LFTE. Additional reactions were received on the controversial subject of LFTE licence, as well as the need for further regulatory guidance for aircraft weighing 2 000 kg and below. Some editorial issues were also addressed.

2.3.1 Applicability of the FTOM requirement

The Opinion states that an FTOM is required for all approved production and design organisations where flight test activities are conducted. The Decision corresponding to this Opinion, will revise the AMC material and elaborate where applicable, the requirement to have an FTOM for alternative procedures to DOA (APDOA) and certification programs.

2.3.2 Applicability of the Appendix XII requirement

The requirement to comply with Appendix XII is applicable for CS-23 aircraft above 2 000 kg and all CS-25, CS-27 and CS-29 aircraft, as further explained below.

<u>CS-23 above 2 000 kg, and all CS-25, CS-27 and CS-29 aircraft</u>

Different stakeholders enquired about the chosen value of 2 000 kg established as a lower limit for the applicability of Appendix XII to CS-23 aircraft. It should be noted that the 2 000 kg weight threshold was set by the review group to allow for the right balance between the aircraft complexity and the cost and severity of flight testing imposed. This value is aligned with the ELA2 upper limit weight value for aeroplanes.

Some reactions stated that the responses provided and presented in the CRD did not clarify entirely the applicability range and in some cases were not consistent. Therefore, there was still a question on whether the 2 000 kg lower weight is an applicability limit for Appendix XII in relation to CS-23 aircraft only, or whether it is applicable to all the CS-23, CS-25, CS-27 and CS-29 aircraft.

Although the Appendix XII applicability was clearly reflected in the proposed Part 21 text, some reactions provided, prompted the Agency to further clarify this issue.

The applicability of Appendix XII is limited <u>only</u> to CS-23 aircraft above 2 000 kg, and all CS-25, CS-27 and CS-29 aircraft.

<u>Gas airships</u>

A different situation was noted for gas airships. Certain gas airships were not captured in the definition of ELA2. Consequently, one reaction questioned if the proposed flight testing requirements and in particular Appendix XII is applicable for gas airships. It should be noted that it was not the intent to make Appendix XII requirement applicable to gas airships.

Therefore, it is emphasised again that Appendix XII is applicable only for CS-23 aircraft above 2 000 kg and all CS-25, CS-27 and CS-29 aircraft.

However, it should be noted that the requirement for a flight test operations manual (FTOM) remains valid for all DOAs/POAs and APDOA conducting flight test activity. These

include airships. This manual will be defining the organisation's policies and procedures in relation to flight test.

2.3.3 Grandfather rule

In response to one reaction, it should be noted that the grandfather rule is applicable for pilots engaged in Category 3 and 4 of flight testing and flight test engineers. For pilots engaged in Category 1 and 2 of flight testing, the competency requirements and conversion rules are already defined in Part-FCL of the Commission Regulation (EU) No 1178/2011 of 3 November 2011.

2.3.4 Flight test definition, categories of flight test, flight test crew qualification

During the NPA 2008-20 consultation period, the Agency received many comments with regard to the definition of flight test categories and the extent of the qualification and experience required for different flight test categories, as well as the training syllabi.

These issues were discussed and agreed upon with the dedicated review group. The changes made to the initial NPA proposal have resulted in the revised text as proposed by CRD 2008-20.

A reaction raised on the training syllabi considered it in some cases excessive (e.g. 350 hours required of ground and 60 hours flight training for Competence Level 1 LFTE), especially in the context of CS-23 aircraft.

It should be noted that in addition to the threshold of 2 000 kg for CS-23 aircraft above which Appendix XII is applicable, provisions were made so that the competence requirement is divided in two, based on the CS-23 aircraft flight characteristics. This may be in support of aircraft with a design diving speed (Md) lower than 0.6 and a maximum ceiling less than 7 620 m (25 000 ft).

Another reaction suggested a different mix of lower and higher values of training hours than the one contained in this proposal (e.g. 300 ground hours and 90 flight hours for Competence Level 1 for LFTE). The number of the training hours within this proposal were based on the group review, therefore the Agency proposes to maintain the training syllabi as per the CRD 2008-20.

One other reaction was related to the subject of maintenance flights. Further information can be found in the regulatory material currently being developed by the Agency on the subject of 'Airworthiness and operational aspects for maintenance check flights' RMT.0393/.0394.

It should also be noted that the Agency is also developing an NPA on 'Flights related to production and design activity' under RMT.0348/.0349.

2.3.5 Flight crew competence/experience requirements for aircraft below 2 000 kg

Based on the feedback received, it is acknowledged that there is a need to further look into standardising or providing guidance for the competence and experience for flight crew involved in flight testing for aircraft below 2 000 kg. This may be the subject of a future rulemaking task.

2.3.6 Lead flight test engineer

A distinct group of comments were made on the NPA on subject of lead flight test engineer's licensing. Similar diverse opinions were recorded during the reaction time period. A convergent direction could not be derived neither from the comments received

nor from the subsequent review conducted by the dedicated review group. Although overall agreement was achieved in defining the competencies and the experience requirements for flight test engineers within Part 21, the subject of a licence was set aside to gather more information.

Therefore, the subject of a lead flight test engineer (LFTE) licence now constitutes the topic of an A-NPA aimed to clarify and to support a decision on this issue.

One reaction requested the LFTE definition be revised to remove the wording referring to assisting the pilot 'in the operation of the aircraft and its systems'. This wording emphasizes the LFTE key role which can impact directly the aircraft safety during flight testing activity. Therefore the Agency proposes to maintain the LFTE definition unchanged. Additional explanations will be added in the guidance material for LFTE.

As previously stated in the CRD 2008-20, it is up to the DOA/POA/APDOA holder to decide if a lead flight test engineer is necessary on board. If a LFTE is necessary on board, then mandatory training has to be given. It should be noticed that if the DOA holder elects not to use a LFTE but other flight test engineer, then it is up to the DOA holder to define and give training corresponding to the task assigned to those flight test engineers. It is not the Agency's intention to mandate any FTE on board. The crew composition is under the responsibility of the DOA/POA/APDOA holder.

2.3.7 Other issues

Based on one reaction, the flight test definition has been updated to use the term 'conformity to the type design' as being the proper wording.

2.4. Summary of the Regulatory Impact Assessment

The options identified in the Regulatory Impact Assessment in NPA 2008-20 were as follows:

a. Option 0: Baseline option (no change)

b. Option 1: Flight testing rulemaking

The affected stakeholders are DOAs/POAs/APDOAs, CS-23 above 2 000 kg, and all CS-25, CS-27, and CS-29 aircraft manufacturers, engine manufacturers, STC holders or applicants who could use flight test as a means to establish compliance with the regulations. In addition, civil flight test crews are directly affected, and, subsequently, flight test training organisations.

Impacts identified in the RIA were: safety, economic and social.

The impact on safety has been evaluated based on reviews of accidents (one for fixed-wing aircraft and one for rotorcraft) collected from flight test related accidents occurred between 1990 and 2005. A review was carried out using the World Airline Accident Summary (WAAS - Civil Air Publication 479). Issues noted from the accidents (missing the formal risk management, composition and competence of the flight crew, safety equipment) would have been addressed by the FTOM as proposed by this Opinion. Similarly to fixed-wing aircraft, the probable cause of a rotorcraft accident sustained the case for the introduction of an FTOM. Additionally, further analysis supported the need for appropriate requirements for flight test crew competence and experience.

The economic impact has been qualitatively evaluated and mitigation measures have been proposed. The experience and competence required from the flight crew are related to the

flight test' and the aircraft's complexity. Four different categories were envisioned to cover the range of flight tests.

The mitigation measures consisted of applicability of Appendix XII being limited to CS-23 aircraft above 2 000 kg, and all CS-25, CS-27 and CS-29 aircraft, on the introduction of a grandfather clause, on adapting the requirements for the flight crew experience and competence to depend on the testing and aircraft complexity and on the establishment of long transitional measures.

Conclusion for the Opinion

Taking into account that the LFTE licence decision will constitute a separate task, (see the RMT.0583 (MDM.003C) A-NPA on LFTE), it is expected that the adoption of this proposal would have a positive safety impact on all organisations and on persons directly involved in flight testing. Economic impacts have been minimised through proportionate requirements and adequate transitional measures.

For further details on this RIA, see NPA 2008-20.

2.5. Overview of the proposed amendments

Subpart G – 'Production Organisation Approval' paragraph 21.A.143 'Exposition' is proposed to be amended to include the requirements for an FTOM. Production organisations are required to have an FTOM if flight testing is part of their activities. Such document shall detail the necessary policies and procedures for an organisation to perform flight testing. A link with Appendix XII is provided with the FTOM requirement. The FTOM shall be submitted to the competent authority.

Subpart J – 'Design Organisation Approval' paragraph 21.A.243 'Data' is proposed to be amended to include the requirements for an FTOM. Design organisations are required to have an FTOM if flight testing is part of their activities. A link with Appendix XII is provided within the FTOM requirement. The FTOM shall be submitted to the Agency.

Subpart P – 'Permit to Fly' paragraph 21.A.708 'Flight conditions' is proposed to be amended to include the requirements identified in the new Appendix XII. This Appendix addresses the following topics:

Applicability: Appendix XII is applicable to CS-23 aircraft with an MTOM above 2 000 Kg and all CS-25, CS-27, and CS-29 aircraft.

Definitions: Flight test, Flight test engineer (FTE) and Lead flight test engineer (LFTE) definitions are provided.

Flight tests categories: Appendix XII introduces a break-down of flight tests in four different categories, depending on flight test complexity levels.

Flight test crew qualifications: Appendix XII provides qualification requirements for pilots performing flight testing categories 3 and 4 and for LFTE.

Requirements for the competence and experience of flight test pilots and lead flight test engineers depend on two parameters: complexity of the flight test and complexity of the aircraft. For pilots engaged in category 1 or 2 of flight testing, the proposed requirements reference Part-FCL. For pilots engaged in category 3 or 4 of flight testing and for the lead flight test engineers, the training required would be specific for the organisation employing them.

Lead flight test engineer (LFTE): Authorisation requirements details from the organisation that employs them are provided.

Competence and experience of other flight test engineers: General experience, training and record keeping requirements are provided.

Done at Cologne, on 22 August 2013.

P. GOUDOU
Executive Director
(signed)

3. References

3.1. Affected regulations

Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations.

3.2. Affected decisions

Decision of the Executive Director of the European Safety Agency amending Decision 2013/001/R of the Executive Director of the Agency of 23 January 2013 on Acceptable Means of Compliance and Guidance Material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for certification of design and production organisations ('AMC and GM to Part 21').

Note: The Agency will publish a Decision containing the AMC and GM when the text of the Implementing Rules has been published in the Official Journal of the EU.

3.3. Reference documents

A-NPA 2013-XX on 'Lead Flight Test Engineer Licence'

ICAO Annex 1 on 'Personnel Licensing'

NPA 2008-20 and CRD 2008-20 on 'Flight Testing'