

FLIGHT TESTING: COMMENTS ON NPA 2008-17, PILOT LICENSING

AFFECTED PARAGRAPH:

FCL.700 Circumstances in which class or type ratings are required **Subparagraph (b)**

PROPOSED CHANGE:

(b) Notwithstanding paragraph (a), in the case of ~~flights related to the introduction of new aircraft types~~ Category 1 or 2 flight tests, as defined in Appendix XII to Part 21, performed under a permit to fly issued in accordance with paragraph 21A.711 of Part 21, the pilot in command shall hold a ~~special certificate~~ flight test rating given by the competent authority, ~~authorising him to perform the flights. This authorisation shall have its validity limited to the specific flights.~~

JUSTIFICATION:

- More accurate definition of flights for which a flight test rating is required;
- Applicable to pilot in command only;
- Proposal to describe holder's privileges in FCL 1.820.

AFFECTED PARAGRAPH:

FCL.725 Requirements for the issue of class and type ratings

PROPOSED CHANGE:

Add a new subparagraph (e), as follows:

(e) Notwithstanding paragraphs (a) to (d), a test pilot who was involved in the development and certification flight tests for an aircraft type shall be entitled to get a type rating for that same aircraft type, on the basis of an assessment of his/her involvement in the flight tests.

JUSTIFICATION:

- The type rating of test pilots having flown the aircraft for its development and certification needs to be addressed as a special case.

AFFECTED PARAGRAPH:

FCL.820 Flight tests

PROPOSED CHANGE:

(a) Holders of a pilot licence for aeroplanes or helicopters shall only undertake, ~~as pilot in command~~, category 1 or 2 flight tests ~~for the certification of aircraft in accordance with article 2 of Commission Regulation No 1702/2003~~, as defined in Appendix XII to Part 21, performed under a permit to fly issued in accordance with paragraph 21A.711 of Part 21, for aircraft

categories relevant to ~~the standards of~~ CS-25, CS-23, CS-27 and CS-29 or equivalent airworthiness codes, when they

- (1) hold at least a CPL in the appropriate aircraft category;
- (2) have completed a training course at an approved training organization appropriate to the intended aircraft and category of flights.

(b) The privileges of the holder of a category 1 flight test rating are to act as a pilot in command in flight tests of categories 1, 2, 3 or 4 conducted by his/her organisation, in accordance with his/her organisation's Flight Test Operations Manual.

(c) The privileges of the holder of a category 2 flight test rating are to act as a pilot in command in flight tests of categories 2, 3 and 4 conducted by his/her organisation, in accordance with his/her organisation's Flight Test Operations Manual.

~~(b) Category 1 flight tests include the following:~~

- ~~(1) initial flights of a new type of aircraft or of an aircraft of which flight or piloting characteristics have been significantly modified;~~
- ~~(2) flights to investigate novel or unusual aircraft design features or techniques;~~
- ~~(3) flights to determine or expand the flight envelope;~~
- ~~(4) flights to determine the specified performances, flight characteristics and handling qualities in extreme conditions.~~

~~(c) Category 2 flight tests include the following:~~

- ~~(1) Flights done in the part of the flight envelope that has already been opened and comprising manoeuvres during which it is not envisaged to encounter flight or handling characteristics significantly different from those already known;~~
- ~~(2) Display flights and demonstration flights of a non type certificated aircraft;~~
- ~~(3) Flights conducted for the purpose of determining whether there is reasonable assurance that the aircraft and its parts and appliances are reliable and function properly.~~

JUSTIFICATION:

- More accurate wording for subparagraph (a), in line with our proposal for FCL.700(b);
- New subparagraphs (b) and (c) to describe flight test rating holder's privileges
- Former subparagraphs (b) and (c) to be deleted, as it is sufficient to cross-refer to categories of flight test that shall be defined in Part 21 Appendix XII.

AFFECTED PARAGRAPH: **FCL.900 Instructor certificates**

PROPOSED CHANGE:

Add a new subparagraph (c), as follows:

(c) Flight test pilots holding a flight test rating and having been involved in the development and certification flight tests for an aircraft type, and holding an instructor certificate (for any other aircraft type), shall be entitled to get an instructor certificate for that aircraft type, on the basis of an assessment of his/her involvement in the flight tests.

JUSTIFICATION:

- The type rating of instructors having flown, as test pilots, the aircraft for its development and certification needs to be addressed as a special case

AFFECTED PARAGRAPH:
FCL.905.FI FI Privileges and conditions

PROPOSED CHANGE:

Remove subparagraph (I), as follows:

~~(I) the instruction required to conduct flight tests, provided that the FI is qualified to conduct such flight tests.~~

JUSTIFICATION:

- Compliance with this subparagraph would be impractical.

AFFECTED PARAGRAPH:
FCL.1000 Examiner certificates

PROPOSED CHANGE:

Add a new subparagraph (c), as follows:

(c) Flight test pilots holding a flight test rating and having been involved in the development and certification flight tests of an aircraft type, and holding an examiner certificate (for any other aircraft type), shall be entitled to get an examiner certificate for that aircraft type, on the basis of an assessment of his/her involvement in the flight tests.

JUSTIFICATION:

- The type rating of examiners having flown, as test pilots, the aircraft for its development and certification needs to be addressed as a special case

AFFECTED PARAGRAPH:
AMC to FCL.820 – Conduct of flight tests – Training course

PROPOSED CHANGE:

The content of the course should vary taking into account the type of aircraft. The following table provides an overview of the different types of course

Categories of flight test	Category 1	Category 2
Aircraft		
CS-25; CS-23 jets and CS-23 Commuters	Condition 1	Condition 2
Other CS-23	Condition 2	Condition 2
CS-27	Condition 1	Condition 2
CS-29	Condition 1	Condition 2

Condition 1:

For CS-25 aircraft; jet aeroplanes certified to CS-23, CS-23 Commuter Category aircraft; and CS-27 and CS-29 rotorcraft, the training should cover Performance; Handling Qualities; Systems and Test management and can be outlined as follows:

- For fixed wing test pilots: ~~duration 10 months; 500~~ 300 hours of ground training; ~~440/420~~ at least 90 flying hours on ~~15/25 different airplanes~~ a substantial number of representative aircraft featuring different pilot interfaces and/or handling qualities. Relevant parts of previous flight test experience or training course can be accounted.
 - For rotorcraft test pilots: ~~duration 10 months; 500~~ 300 hours of ground training; ~~440/420~~ at least 80 flying hours on ~~4 to 10 rotorcraft~~ a substantial number of representative aircraft featuring different pilot interfaces and/or handling qualities. Relevant parts of previous flight test experience or training course can be accounted.
- ~~Batchelor of Sciences or equivalent University standards are usually requested from applicants.~~

Condition 2:

This condition requires a significant amount of flight experience, in accordance to the task and requires training for flight testing activities, the amount of which should be specifically adapted to the tasks. Such courses ~~may last 15 weeks and the~~ should include flying training ~~should~~ amounting to ~~38~~ at least 30 hours on ~~12 types of airplanes~~ a substantial number of representative aircraft featuring different pilot interfaces and/or handling qualities.

JUSTIFICATION:

- Our proposed changes result from analysis of European industry's current best practices and experience.

FLIGHT TESTING: COMMENTS ON NPA 2008-20, FLIGHT TESTING

AFFECTED PARAGRAPH:

Regulation (EC) 1702/2003, Article 2f – Competence and experience of flight crews participating in flight test activities

PROPOSED CHANGE:

(a) The competence and experience requirements established in Appendix XII to Part-21 shall become applicable 18 months following publication of this amendment to Part-21.

(b) Flight crew members participating in flight test activities at the date of entry into force of this Regulation shall be considered as having complied with the relevant requirements of Appendix XII to Part-21 and may continue to exercise their present ~~scope of functions~~ activities, as defined by their function onboard and the categories of aircraft and flight tests for which they are authorised. Any changes to ~~the scope of their functions~~ these elements shall comply with the requirements of Appendix XII to Part-21.

JUSTIFICATION:

- “Scope of functions” leaves too much room to interpretation and needs to be replaced by a more precise language.

AFFECTED PARAGRAPH:

Title of Appendix XII to Part-21, Competence and experience of flight test engineers and of pilots engaged in categories 3 and 4 of flight testing

PROPOSED CHANGE:

Appendix XII – Competence and experience ~~of flight test engineers and of pilots engaged in categories 3 and 4 of flight testing, and of flight test engineers~~

JUSTIFICATION:

- The title, as proposed in the NPA, may lead to understand that, with regard to flight test engineers, Appendix XII only relates to those engaged in categories 3 and 4. The title should clearly show that the Appendix relates to flight test engineers engaged in any category of flight testing.

AFFECTED PARAGRAPH:

Appendix XII to Part-21, paragraph (a)

PROPOSED CHANGE:

(a) General:

This Appendix contains the ~~conditions~~ for qualifications of flight crew involved in the conduct of flight tests for aircraft certified in accordance with CS-23, CS-25, CS-27 or CS-29.

JUSTIFICATION:

- Editorial

AFFECTED PARAGRAPH:

Appendix XII to Part-21, paragraph (b)

PROPOSED CHANGE:

(b) Categories of flight tests

Flight tests include the following four categories:

(1) Category One

- Initial flight(s) of a new type of aircraft or of an aircraft of which flight and/or piloting characteristics may have been significantly modified.
- Flights to investigate novel or unusual aircraft design features or techniques.
- Flights to determine or expand the flight envelope.
- Flights to determine the regulatory performances, flight characteristics and handling qualities in extreme conditions.

(2) Category Two

- Flights of a new type of aircraft or of an aircraft of which flight and/or piloting characteristics may have been significantly modified, done in the part of the flight envelope already opened and comprising manoeuvres, during which it is not envisaged to encounter flight and/or handling characteristics (performance and flying qualities) significantly different from those already known.
- Display flights and demonstration flights of a non-type-certificated aircraft.
- Flights conducted for the purpose of determining whether there is reasonable assurance that the aircraft, its parts and appliances are reliable and function properly.
- Flight dedicated to develop a new equipment or system not already certified on another aircraft and having impact on aircraft airworthiness
- Flight performed after embodiment of a new or not yet approved major design change of previously certified equipment or system and having impact on aircraft airworthiness

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- Training flights aimed at acquiring a flight test rating.

(3) Category Three

- Flights performed prior to issuance of an individual certificate of airworthiness in order to establish the conformity of the relevant aircraft production to the approved type design.

(4) Category Four

- Flights performed after embodiment of a new not yet minor approved design change which ~~does not need an assessment of the general behaviour of the aircraft and/or the impact on crew procedures when the new or modified system is operating.~~
 - o does not require specific flight test skills;
 - o does not need an assessment of the general behaviour of the aircraft;
 - o does not change significantly the crew procedures; and

- does not need an assessment of the crew procedures when the new or modified system is operating.

Nevertheless, test flights rated category N according to the above classification, but requiring from the crew a technical skill equivalent to the one required for test flight rated category N-1 or more, have to be considered as category N-1 or more.

JUSTIFICATION:

- Need to add training flights for flight test rating into Category 2
- Clarification of the conditions to classify a flight into Category 4
- Clarification of Category 2 flights :
 - To avoid misunderstanding with acceptance flight (production, maintenance) classified in Category 4
 - For new equipments

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AFFECTED PARAGRAPH:

Appendix XII to Part-21, paragraph (c)

PROPOSED CHANGE:

Replace paragraph (c) and the table by the following text:

(c) Competence and experience of flight crews:

A Flight Test Engineer (FTE) is a crew member who acts as a test conductor during the test flight and participates in the operation of the aircraft, its systems and/or its instrumentation for the purpose of the test.

(1) Pilots engaged, as pilot in command, in flight tests of categories 1 and 2 shall comply with the conditions established in Part-FCL.

(2) Flight test engineers flying in test flights of categories 1 and 2 must be suitably trained, qualified and be medically fit for the task.

The lead flight test engineer in test flights of categories 1 and 2 must hold a Flight Test Engineer certificate in the respective category.

Those certificates shall be granted after having satisfactorily completed a specific training course, which is accepted by the Agency. The certificate shall be issued by the approved training organisation, which has delivered the training.

The currency of Test qualifications (rating or certificate) is prorogated if the flight test crew member has logged a minimum of 10 hours of test flying in last 12 months, or has performed a test flight under the supervision of a cat1 or cat2 flight test instructor.

Flight test engineers holding a certificate for categories 1 or 2 have the privilege to act as lead Flight Test Engineers in test flights of categories 3 and 4.

(3) A test pilot engaged as pilot in command in flight tests of categories 3 and 4 must hold a valid pilot licence appropriate to the category of aircraft under test issued in accordance with Part-FCL or a flight test rating appropriate to the intended aircraft, issued in accordance with FCL.820.

The lead flight test engineer in flight tests of categories 3 and 4 must be suitably qualified and medically fit for the tasks performed, in accordance with national regulations.

The pilot in command in flight tests of categories 3 and 4 and the lead flight test engineer must have the competence and experience specified hereafter:

- Category 3: Have participated in all flights on at least five aircraft enabling the issuance of their individual certificate of airworthiness
- Category 4: Have been informed on the change to Type Design for which the flight tests is to be undertaken

JUSTIFICATION:

- Paragraph restructured in order to establish two different sets of requirements for Cat 1-2 FTE and Cat 3-4 FTE respectively.
- Elements inserted to establish authorization renewal requirements for flight test engineers, as for the pilots stated in Part-FCL
- Elements in removed table transferred partly into new text, and partly into AMC.

Mise en forme : Puces et numéros

AFFECTED PARAGRAPH:

Appendix XII to Part-21

PROPOSED CHANGE:

Add a new paragraph (d):

(d) Flight test instructors

Flight test instructors shall be pilots and engineers, qualified for Category 1 or 2 test flights, and appointed by their organization in accordance with the Flight Test Organization Manual.

JUSTIFICATION:

- Need to define conditions for appointing flight test instructors

AFFECTED PARAGRAPH:

Title of AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b)

PROPOSED CHANGE:

Change the title of the AMC as follows:

AMC to 21A.139, 21A.143, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b)
Flight Test Operations Manual (FTOM)

JUSTIFICATION:

- The NPA proposes a new subparagraph 13 in Part 21 paragraph 21A.143 (production organisation exposition). This needs to be referred to in the AMC on FTOM.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (b)

PROPOSED CHANGE:

(b) Formal hazard assessment:

The FTOM should describe the organisation's policy relative to formal hazard assessment and associated methodologies, in particular identifying circumstances when a formal hazard assessment is ~~not~~ considered necessary.

JUSTIFICATION:

- It is easier and more logical to define those cases where a formal hazard assessment is necessary.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (c)

PROPOSED CHANGE:

(c) Flight test air crew:

According to the category of test, the FTOM should describe the organisation's policy relative to composition and competence of the minimum crew. The policy must comply with the requirements contained in Appendix XII to Part-21. The role of flight test air crew in relation with the demonstration of compliance with the applicable certification specifications or environmental protection requirements should be described. The **organisation's policy and programme for the training of its flight crew members** should ~~include~~ **be described, including** the specific project-related training programmes required for the various categories of flights. **A current list of appointed flight test crew members should be maintained, and included or referenced in the FTOM.**

JUSTIFICATION:

- More accurate wording.
- Need to identify authorised flight test crew members.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (e)

PROPOSED CHANGE:

(e) Flight test instrumentation and data processing:

The FTOM should describe ~~specific instrumentation applicable to various types of flights and the procedure for data processing within the organisation~~ or refer to the procedures by which the organisation ensures that:

- The instrumentation required for a flight is installed, calibrated, and properly used for the specific purposes of the flight;
- The test data are properly transmitted or reported as necessary for further processing.

JUSTIFICATION:

- The FTOM cannot describe details of instrumentation used for various types of flights and of data processing means. It should describe how the organisation ensures that the instrumentation and data are available and used as needed.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (f)

PROPOSED CHANGE:

(f) Safety Equipment:

The FTOM should list, depending on the nature of the flight, the specific safety equipment ~~which that~~ must be available: e.g., emergency exits, parachute, ~~and~~ oxygen masks.

JUSTIFICATION:

- Editorial

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (h)

PROPOSED CHANGE:

(h) Documents:

The FTOM should list the documents to be produced for flight testing, ~~and include or refer to the procedures related to their issue, update and follow-up:~~

(i) Documents Associated with a Flight Test Programme

~~– General Flight Test Programme~~

- Flight Order for a given flight including:

- Listing of the tests to be performed and associated conditions
- Category of the flight (e.g. category 1)
- Composition of aircrew
- Names of technicians or any passengers
- Loading of the aircraft
- Reference to approved flight conditions

- Flight crew report

(ii) Documentation required on board during flight testing

JUSTIFICATION:

- The way of producing and using the documents should be indicated.

- The notion of “General Flight Test Programme” is unclear, and, for the purpose of aircraft certification, redundant with the certification plan.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (i)

PROPOSED CHANGE:

(i) Permit to fly:

The FTOM should include the procedures related to the approval of the flight conditions and issue of permits to fly, in accordance with Subpart P or make reference as relevant to DOA or POA procedures. ~~The flight conditions presented to EASA approval before the first flight of a new aircraft may include information on the management of changes between and during flights, together with the justifications demonstrating the safety of the flight under such circumstances. Such flight conditions would allow the performance of a series of flights without requiring re-approval by EASA.~~

JUSTIFICATION:

- The last two sentences are relevant to Subpart P and should not be located in the AMC on FTOM, where it is sufficient to refer to the organisation's procedures for implementation of Subpart P.

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (j)

PROPOSED CHANGE:

Delete paragraph (j):

~~(j) Definition of production flight test programme:~~

~~The design approval holder should define the flight test programme needed for flights performed prior to issuance of an individual certificate of airworthiness in order to establish the conformity of the relevant production aircraft to the approved type design. This programme is part of the flight conditions defined in 21A.708(b), to be approved by EASA or under the DOA privilege of 21A.263(c)(6).~~

JUSTIFICATION:

- The proposed paragraph (j) is relevant to Subpart P and should not be located in the AMC on FTOM, where it is sufficient to refer to the organisation's procedures for implementation of Subpart P (first sentence of paragraph (i)).

AFFECTED PARAGRAPH:

AMC to 21A.139, 21A.243, 21A.14(b), 21A.112B(b) and 21A.432B(b), paragraph (k)

PROPOSED CHANGE:

~~(k-j)~~ Demonstration, training and air show flights:

The FTOM should include the ~~procedure to organisation policies for the conduct of flights for the purpose of demonstration, training and air show flights~~ with aircraft flying under a permit to fly ~~or under a certificate of airworthiness~~.

JUSTIFICATION:

- Paragraph renumbering due to deletion of paragraph above.
- Need to extend the scope of the paragraph

AFFECTED PARAGRAPH:
AMC to Appendix XII to Part 21

PROPOSED CHANGE:

Replace this AMC by the attached one.

JUSTIFICATION:

- Tabular form more user-friendly.
- Our proposed changes result from analysis of European industry's current best practices and experience.