



EASA

European Aviation Safety Agency

Flight test classification in the framework of Commission Regulation (EU) 2015/1039

Lessons Learnt

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Objectives

1. Provide the essential elements of the new rules for flight testing
2. Share the main difficulties so far experienced
3. Provide the key elements for a correct decision making process in the flight test category determination
4. Conflicts resolution



FCL.820(a),(b) Flight test rating prescribes that:

- a) Holders of a pilot licence for aeroplanes or helicopters shall only act as PIC in category 1 or 2 flight tests, **as defined in Part-21**, when they hold a Flight Test Rating.
- b) The obligation to hold a Flight Test Rating established in (a) shall only apply to flight tests conducted on:
 - (a) helicopters certificated or to be certificated i.a.w. CS-27 or CS-29 or aeroplanes certificated or to be certificated i.a.w
 - (i) CS-25 or equivalent airworthiness codes; or
 - (ii) CS-23 or equivalent airworthiness codes, except for aeroplanes with an maximum take-off mass of less than 2 000 kg.



REGULATORY BACKGROUND (cont.)

- Therefore, PART-FCL does not define the Flight Test Categories and invokes Part-21 for their definition.
- Therefore, Part-21 should define:
 - the various FT Categories
and as a consequence
 - the Flight Test Crew levels of competence associated to the various FT Categories.
- All the above items were addressed by:

COMMISSION REGULATION (EU) 2015/1039 (30 June 2015)
amending
Annex I (Part 21) to Regulation (EU) No 748/2012



CONTENT OF C. R. (EU) 2015/1039

THE CONTENT OF COMMISSION REGULATION (EU) 2015/1039:

- The introduction of the new Appendix XII “*Categories of Flight Tests and associated aircrew qualifications*”
- The introduction, at paragraph 21.A.143 , of a FTOM for POAs and DOAs that need to conduct flight tests.



Appendix XII CONTENT

1. ENTRY INTO FORCE
2. APPLICABILITY
3. DEFINITIONS
4. CATEGORIES OF FLIGHT TESTs
5. COMPETENCE and EXPERIENCE of PILOTS and Lead FTEs
6. COMPETENCE and EXPERIENCE of OTHER FTEs



Appendix XII

ENTRY INTO FORCE

21 July 2015

- APPLICABILITY, DEFINITIONS, **CATEGORIES OF FLIGHT TESTs** and COMPETENCE and EXPERIENCE of OTHER FTEs

1 January 2018

- COMPETENCE and EXPERIENCE of PILOTS and LFTEs
(as presented in the table in slide 12 below)



Appendix XII

APPLICABILITY & DEFINITIONS

APPLICABILITY:

- The categories of Flight Test apply to flight tests for A/C certified or to be certified i.a.w. CS-23 and with a MTOM of $\geq 2\ 000$ kg, CS-25, CS-27, CS-29 .

DEFINITIONS:

1. Lead FTE

- a FTE assigned for flight test duties in an A/C who has the privileges to operate equipment that could significantly interfere with the essential A/C systems or that could significantly impact the A/C flight characteristics.

2. FLIGHT TESTs

- flights for the development phase of a new design;
- flights to demonstrate compliance to the CB or conformity to the approved TD;
- flights intended to experiment new design concepts;
- flight test training flights.



Appendix XII

CATEGORIES of FLIGHT TEST

Category 1 flight tests:

- Initial flight(s) of a new type of aircraft or of an aircraft of which flight and/or handling characteristics may have been **significantly** modified;
- Flights during which it can be envisaged to potentially encounter flight characteristics **significantly different** from those already known;
- 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 when flight envelope limits are approached;
- Flight test training for Category 1 flight tests



Appendix XII

CATEGORIES of FLIGHT TEST (Cont.)

Category 2 flight tests:

- Flights not classified as Cat 1 on an A/C whose type is not yet certified;
- Flights not classified as Cat 1 on an A/C of an already certified type, after embodiment of a not yet approved modification and which:
 - require an assessment of the general behaviour of the aircraft; or
 - require an assessment of basic crew procedures, when a new or modified system is operating or is needed; or
 - are required to intentionally fly outside of the limitations of the currently approved operational envelope, but within the investigated flight envelope;
- Flight test training for Category 2 flight tests.



Appendix XII

CATEGORIES of FLIGHT TEST (Cont.)

Category 3 flight tests:

- Flights performed for the issuance of statement of conformity for a new-built aircraft which do not require flying outside of the limitations of the type certificate (TC)/ aircraft flight manual.

Category 4 flight tests:

- Flight not classified Category 1 or 2 on an aircraft of an already certified type, in case of embodiment of a not yet approved design change.



Appendix XII

COMPETENCE LEVELS for FTPs and LFTEs

To determine the appropriate competence level as a function of the FT category and of the A/C class, Appendix XII contains the following table applicable for **Pilots** and LFTEs:

AIRCRAFT	Categories of flight test			
	1	2	3	4
CS-23 commuter or aircraft having a design diving speed (Md) above 0,6 or a maximum ceiling above 25 000 ft, CS-25, CS-27, CS-29 or equivalent airworthiness codes	1	2	3	4
Other CS-23 with an MTOM of or above 2 000 kg	2	2	3	4
Competence level				



Appendix XII

REQUIREMENTS for AIRCREWS

EXAMPLE:

Establish the V_{MCA} on a standard CS23 A/C.

Which are my Aircrew Requirements?

- **First Step: Establish the Category of Flight Test.**

In this case it is a CAT 1 FT; (Flights to determine the regulatory performances, flight characteristics and handling qualities when flight envelope limits are approached);

- **Second Step: Consider the A/C class.**

In this case it is a standard CS23 A/C;

- **Their Step: Determine the minimum competence level of the flight crew.**

In this case the minimum competence level to carry out the flight is 2. So, in this case the PIC must have at least a CAT 2 FTR and the LFTE must have at least the Competence level 2 qualification.

AIRCRAFT	Categories of flight test			
	1	2	3	4
CS-23 commuter or aircraft having a design diving speed (Md) above 0,6 or a maximum ceiling above 25 000 ft, CS-25, CS-27, CS-29 or equivalent airworthiness codes	1	2	3	4
Other CS-23 with an MTOM of or above 2 000 kg	2	2	3	4
Competence level				

It is ESSENTIAL to identify CORRECTLY the CATEGORY OF FT



Categories of FT

MAIN CHALLENGES

The correct identification of the Category of a given FT has turned out to be not an easy exercise for some organizations. The main reasons are:

- The Regulation has entered in force relatively recently;
- European countries had in force different rules as far as flight test is concerned. In some cases there were no rules;
- DOAs are responsible for the Classification of FT according to Appendix XII, however, not always their procedures provide exhaustive guidance on how to classify the flight tests;
- There is sometimes the tendency to classify the flight tests based on the pilots' availability and not on the classification criteria;



Categories of FT

MAIN CHALLENGES (cont.)

- For embodiment of changes to already certified A/C it is often difficult to determine if the FT can be classified as:
 - Cat 1 vs Cat 2 or
 - Cat 2 vs Cat 4.
- **DOA personnel involved in flight test sometimes does not have enough background and experience to perform the classification.**

For example, what should the Category of FT be for a simple aerial installation?



GUIDELINES FOR PROPER CLASSIFICATION

To carry out a proper classification, it is essential to understand the general principles behind the Category classification concept:

- The concept of addressing Flight Test through the Categories was developed to introduce a **flexible and proportional approach**.
- Assess if the flight can be defined as a FT i.a.w. the “General” para of the rule.
- Always apply a *top down approach*, starting from the criteria used to identify Category 1 FT, until the correct category is determined.

Maintenance check flights are outside the scope of this rule and a dedicated RMT is taking care of these particular type of flights.



GUIDELINES FOR PROPER CLASSIFICATION (cont.)

- FT of a not yet certified A/C should be considered Cat 1 or 2;
- FT for a modification of an already certified A/C may be Cat 1, 2 or 4;
- A Cat 3 FT (production flight test) can apply only if a TC or STC has been already issued;
- FT which require manoeuvres/conditions which deviate significantly from the **STANDARD OPERATIONAL** use of the A/C should be classified as Category 2 FT;



GUIDELINES FOR PROPER CLASSIFICATION (cont.)

- A FT that is only aimed to check the good functioning of an equipment can be Cat 4;
- A Cat 4 classification should not be invoked when the a/c is flown outside of the limitations of the AFM/RFM (e.g. above V_{NE});
- When a FT requires a global crew procedures assessment it should be classified as Cat 2;
- **In addition, a GM is provided to help understand the definitions but this cannot be regarded as a “COOKING BOOK” and an effort is REQUIRED by DOAs to assess each specific case.**

Therefore, going back to the question in slide 15, what do you think the Category of FT should be for a simple installation such as the one presented in the following slide?



External Mount and Camera (1/2)





External Mount and Camera (2/2)





DIFFICULT CASES

- In spite of the guidance material and the principals highlight above, there could be some cases in which the FT Category classification by the DOAs might be difficult and/or incorrect.
- An incorrect FT Category classification in turn might cause some problems to the EASA crews when they have to fly the prototype as part of their agreed LOI.

THIS WILL TRIGGER INEVITABLY A DISAGREEMENT BETWEEN THE EASA TEAM AND THE APPLICANT .



Conflicts Resolution

- Disagreements between the applicant and the EASA team should preferably be resolved at team level.
- In case of remaining disagreement, the issue will be carried forward to the PCM's Section Manager and the responsible Senior Expert who will discuss the case on the basis of the justifications given by the PCM and the Expert;
- This is the first internal level for conflicts resolution;



Conflicts Resolution (cont.)

- In case of remaining disagreement, the same process will take place with the involvement of the HoD Vs Chief Experts or ultimately CT Director Vs Chief Eng.
- The Management line can always take a justified decision, overruling the Expert's advice. Ultimately, the CT Dir. may take the final decision.
- The Expert line has only got the possibility to challenge such a decision (with a proper justification) and invoke a higher level of assessment until the final level is engaged (CT Director Vs Chief Engineer).
- All of the above is described in details in the Certification Handbook.
- In parallel, initiatives, such as this one, have been launched to brief all the FT teams with the objective to harmonize the approach to FT Cat classification.



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Questions?

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