



EASA
European Aviation Safety Agency

Part 21 Amendment 2015/1039

Flight Test Update

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CONTENT OF THE PRESENTATION

- **INTRODUCTION;**
- **APPENDIX XII PRESENTATION;**
- **FTOM PRESENTATION.**



INTRODUCTION

**Under the need to fulfil some FT requirements left
unattended:**

on JUNE 30th 2015,

**COMMISSION REGULATION (EU) 2015/1039 - amending
Annex I (Part 21) to Regulation (EU) No 748/2012 – was
published.**



INTRODUCTION

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

- **the introduction of the new Appendix XII -"Categories of FT and associated aircrew qualifications";**
- **the introduction, at point 21.A.143 , of a FTOM for POAs that need to conduct FT;**
- **the introduction, at point 21.A.243 , of a FTOM for DOAs that need to conduct FT.**



APPENDIX XII CONTENT

- **QUALIFICATIONS APPLICABILITY ;**
- **CATEGORIES OF FT;**
- **LEAD FLIGHT TEST ENGINEER role;**
- **COMPETENCE AND EXPERIENCE REQUIREMENTS
for LFTEs and PILOTS.**



Appendix XII

QUALIFICATIONS APPLICABILITY

The qualifications established in the Appendix XII regard:



the qualifications of aircrew only involved in flight tests for A/C certified or to be certified i.a.w. CS-25, CS-27, CS-29, CS-23 and with a MTOM of $\geq 2\,000$ kg.



Appendix XII

QUALIFICATIONS APPLICABILITY

So what about all the other cases not addressed by App XII?
(E.g. CS-LSA, CS-VLA, CS-22 or CS-23 A/C with a MTOM of < 2000 kg.)



The crew qualifications must be given
in the FTOM of the Organization when
describing the competency of its aircrew.

It is accepted that the competency
should be proportionate to the A/C
complexity & characteristics.



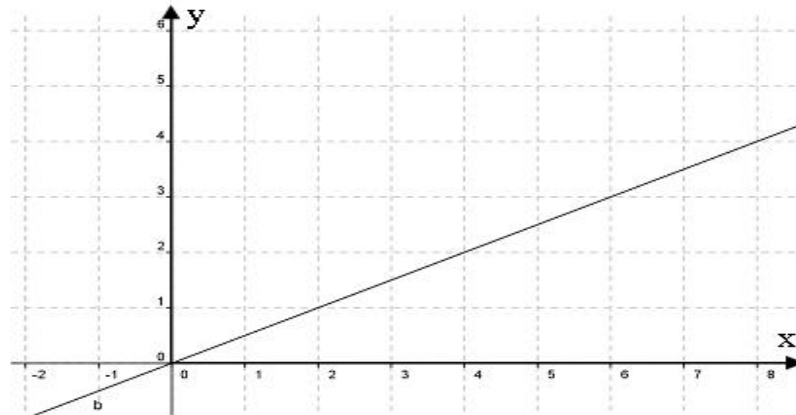


Appendix XII

CATEGORIES of FLIGHT TEST

APPENDIX XII establishes Flight Test Categories

When establishing the various FT Categories, the Agency used the proportionality approach/principle.



- So, in the attempt to satisfy all the needs, 4 different FT categories were generated: Cat 1, 2, 3 and 4.
- FT Cat 3 will not be addressed in this presentation since it is specifically related to production Flight Test.



Appendix XII

CATEGORIES of FLIGHT TEST

CRITERIA FOR CATEGORY DIFFERENTIATION

Once determined that a flight must be considered as a FT, **what are the general guide lines to establish the correct flight test category?**

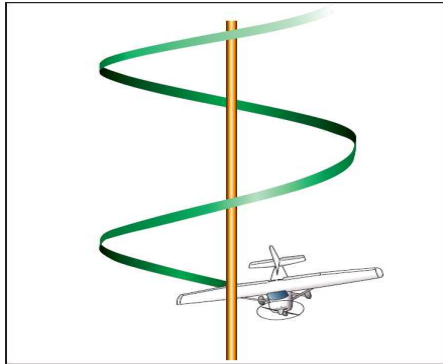
- ❖ Flight tests on A/C without a TC should be considered as Cat 1 or 2 FT.
- ❖ Flight tests for a Mod. of an A/C already certified may be Cat 1, 2 or 4 depending on the PURPOSE of the test;



Appendix XII

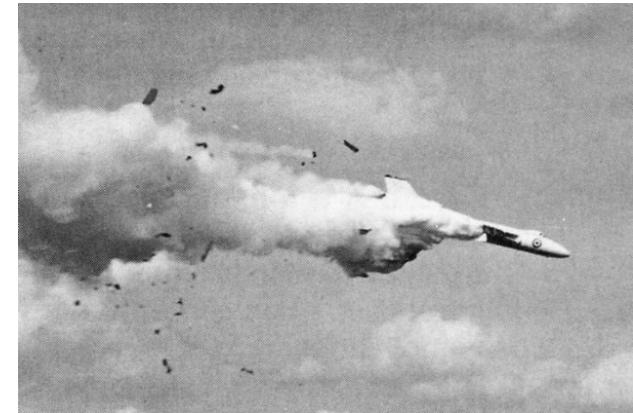
CATEGORY 1 FLIGHT TESTS

A few examples of FT to be considered as CAT1 FT:



- ❖ spinning, V_{MC} , V_{MU} , initial stalling, H/V diagrams and Category A engine failures;

- ❖ where encounter of surprising or even hazardous flight characteristics can be expected (e.g. flutter or all the envelope expansion flights);
- ❖ to determine the A/C Perf. and HQ where the flight envelopes limits are approached (Alt., attitudes, W & CG, V, Temp. and so on);
- ❖ Flight test training for CAT 1flight tests.



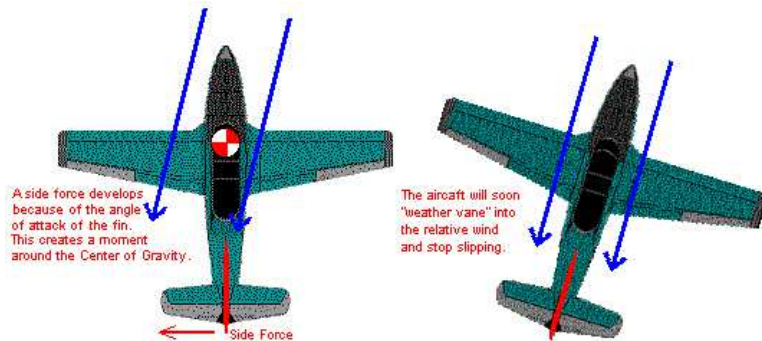
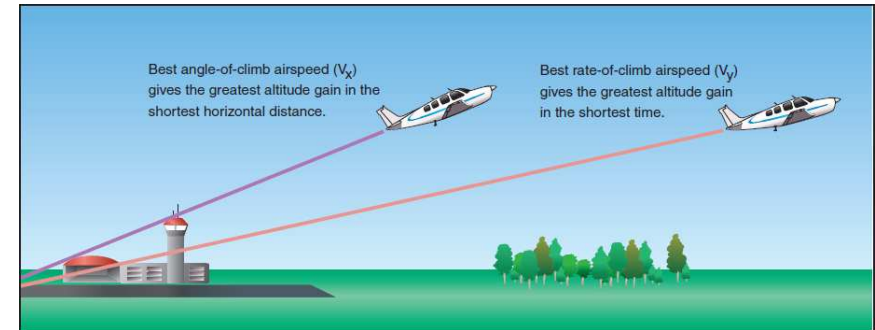


Appendix XII

CATEGORY 2 FLIGHT TESTS

A few examples of FT to be considered as CAT2 FT:

- ❖ All-engines-operating climb or cruise performance;



- ❖ Static stability demonstration;

In general, when the flight test envelope has already been opened and the general behaviour of the aircraft is adequately safe.

- ❖ Systems tests (A/P, FGS, GPWS, TCAS) when it is necessary to fly the A/C in deviation from the SOPs (e.g. SHSS or 2 g turns for CS-25 A/C).



Appendix XII

CATEGORY 4 FLIGHT TESTS

Under this Category you may consider the following flights:

- Flights required by the DOA to show compliance with airworthiness requirements of “not yet approved data”.
- Flights in which the modification of the A/C should not affect the A/C behaviour in any way.

A typical CAT 4 FT may be a flight to approve/certify a:

- ❖ cabin conversion;
- ❖ ELT installation;
- ❖ a new in-flight entertainment system;
- ❖ a new system (provided only the good functioning of the system is required and there is no need to fly outside the AFM limitations, nor to operate the A/C in deviation from the SOPs).





Appendix XII

CATEGORIES of FLIGHT TEST

Example: Certify a new TAWS Mod on an already certified A/C.

1st step: determine if a flight may be considered as a FT (§B of App. XII)

- ❖ YES, it may be considered as a Test Flight.

2nd step: classify the flight test. (It could be a CAT 1, 2 or 4 FT depending on the PURPOSE of the FT)

- ❖ Is it a CAT 1 FT? NO;
- ❖ Is it a CAT 2 FT? Maybe;
- ❖ Is it a CAT 4 FT? Maybe;



Appendix XII

CATEGORIES of FLIGHT TEST

- So, if this TAWS Mod needs to be certified on an helicopter, this flight can be classified as CAT 4 FT;
- On the other hand, if this TAWS Mod needs to be certified on a CS-25 Large A/C, this flight need to be classified as CAT 2 FT;
- In essence, the identification of the **CORRECT FT Category** is essential to determine the minimum required crew **COMPETENCE**;



- This in turn has a direct bearing on the potential safety of the flight.



Appendix XII

LFTE

Appendix XII introduces the LFTE figure.

- ❖ So, what is the LFTE definition?
- ❖ What are the characteristics/peculiarities of a LFTE?
- ❖ What are competences required to become LFTE?
- ❖ Do LFTEs have an attestation or a certificate?



Appendix XII

LFTE

LFTE definition:

a FTE assigned for duties in an A/C :

❖ for the purpose of conducting flight tests

or

❖ for the purpose of assisting the pilot in the operation of the A/C and its systems during flight test activities.

- The regulator felt the need to establish such a role to differentiate it from the role of the standard FTE who mainly records FT data and has very little interactions with the FTP during the conduct of the flight.
- So what are specific duties and privileges of a LFTE?



Appendix XII

LFTE Characteristics/Peculiarities

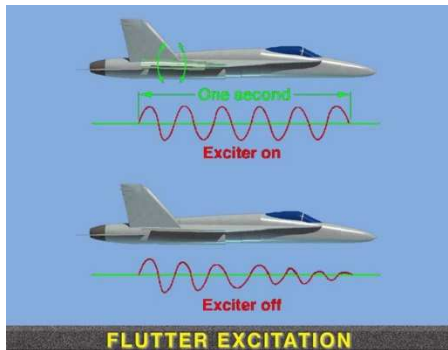
So a LFTE has a specific duties and privileges during a test flight in an A/C!

For Ex., directly or through a dedicated flight test instrumentation, he could:



- ❖ interfere with the aircraft flight control system
(e.g. he could degrade or upgrade the A/C envelope protection)

- ❖ Interfere with the engine control system some of which may not even be accessible to the pilot (e.g. he could allow the engine to spool down to a sub flight idle mode);
- ❖ impact A/C stability through W. & C.G. in flight management (e.g. moving the water ballast);



- ❖ impact A/C control through FCS configuration changes
(e.g. for flutter excitation);





Appendix XII

LFTE Characteristics/Peculiarities

LFTE assists the pilot in the operation of the A/C and its systems during FT activities

•The word ‘assist’ (the pilot) should be understood in the sense of the **critical actions**, such as (and not limited to):

- ❖ Changing the AFCS laws;
- ❖ Interfering with the EIU (e.g. even for engine shut down);
- ❖ Changing the stability of the aircraft;
- ❖ Changing the configuration of critical A/C systems (e.g. auto-land)

as instructed and agreed by the PIC

C-12 TAKEOFF AND LANDING DATA (TOLD)	
For use of this form, see TC 7-216, the appropriate agency is TNAOCC.	
TAKEOFF CONDITIONS	
STATION	FIELD LENGTH AVAIL.
TEMP C°	P.A.
TAKEOFF WEIGHT	MINIMUM TAKEOFF POWER
CONFIGURATION: FLAPS 0% FLAPS 40%	
T.O. FLD. LENGTH REQUIRED	ACQ/DG DISTANCE
V ₁ / V _R	V ₂ / V _{YR}
CLB. GRD. ALT.	
LANDING DATA	
RUNWAY LENGTH AVAILABLE	
LANDING WEIGHT	
V _{ref}	V _{app}
<small> Max 100% (1.3 X V_{ref} @ 1.3 G) Max 80% to 80% (1.3 X V_{ref} @ 1.3 G) </small>	
<small> Max 100% (1.3 X V_{ref} @ 1.3 G) Max 80% to 80% (1.3 X V_{ref} @ 1.3 G) </small>	
LANDING DISTANCE	

DA FORM 4888-R, APR 2002
SECTION OF JUL 90 IS OBSOLETE



or

if requested by the flight test order (or similar document).



Appendix XII

LFTE Competence

LFTE qualification is a COMPETENCE BASED qualification.

Appendix XII foresees 4 levels of COMPETENCE, based on:

- An adequate training programme.

For Competence Level 1 and 2 it should cover at least the following domains:

- ☐ the theoretical domain;
 - ☐ the flight test techniques and flight training domains.
- A minimum flight experience;



Appendix XII

LFTE Competence

LFTE courses are generally specific both:

- ❖ to a certain category of aircraft (FW or RW) and
- ❖ to a certain category of FT.

This also implies that training organisations may develop specific 'bridge courses' in order:

- ❖ to extend LFTEs privileges to further categories of A/C or
- ❖ to further categories of flight test.



Appendix XII

LFTE Competence

MINIMUM FLIGHT EXPERIENCE

- ❖ To qualify for Competence level 1, 2 or 4, the LFTEs must have the following minimum flight experience:

		LFTE
COMPETENCE LEVEL	1	at least 100 hrs of FT experience (training included)
	2	at least 50 hrs of FT experience (training included)
	4	as defined in the Organization's FTOM.

- ❖ In addition for LFTE with competence level 1 or 2 duties on CS25/CS29 aircraft, flight test instructions should be received on at least one A/C certified i.a.w. CS25/CS29 standards.



Appendix XII

LFTE AUTHORISATION

- Before being appointed as LFTE, he/she should undergo an initial medical check that takes due account of the intended flight activity;
- Such a check should be regularly revalidated (typically every 2 years);
- If the LFTE holds a Class 1 or 2 medical certificate issued i.a.w. Part-MED, the medical check is not necessary;
- Finally, after the Organization is happy with the Competence level of the FTE and his health status, it can issue a LFTE authorization in which the scope of such authorisation can be specified (e.g. Competence level 1 on CS-23 Aircraft).



Appendix XII

COMPETENCE LEVELs for PILOTS

Appendix XII foresees also 4 levels of COMPETENCE for PICs, based on:

- An adequate training programme;
- A minimum flight experience.

		PIC
COMPETENCE LEVEL	1	CAT 1 FTR as per AMC1 FCL.820
	2	CAT 2 FTR as per AMC1 FCL.820
	4	Valid licence (CPL minimum) and <ul style="list-style-type: none">• any FTR or• at least 1000 hrs as PIC on similar A/C type



FTOM for DOAs and POAs

As already mentioned, COMMISSION REGULATION (EU) 2015/1039 - on top of the new Appendix XII which we have just seen - demands:

- **the introduction, at point 21.A.143 , of a FTOM for POAs that need to conduct FT;**
- **the introduction, at point 21.A.243 , of a FTOM for DOAs that need to conduct FT;**



FAQ

- **Purpose** of the FTOM
- **Reduction** of FTOM contents (in case of low/limited activity)
- Need for **LFTE** / specific **Flight Test CVE**
- **Guidance material** for establishing an FTOM
- **Subcontracting** flight test activity
- How to meet the **deadline** (01/01/16)



Purpose of FTOM

- DO is the operator of the aircraft under test
- FTOM shall describe how the essential requirements for a/c operations are met
 - Who performs the flights?
 - How are flights executed?
 - Required instruments and equipment?
 - Required documents?
- FTOM is not specific to a given flight



Reduction of FTOM contents

- Requirements of 21.A.243(a) apply to all DO
- FTOM shall be proportionate to the organisation's scope
- Reduction of contents is therefore linked to the individual scope



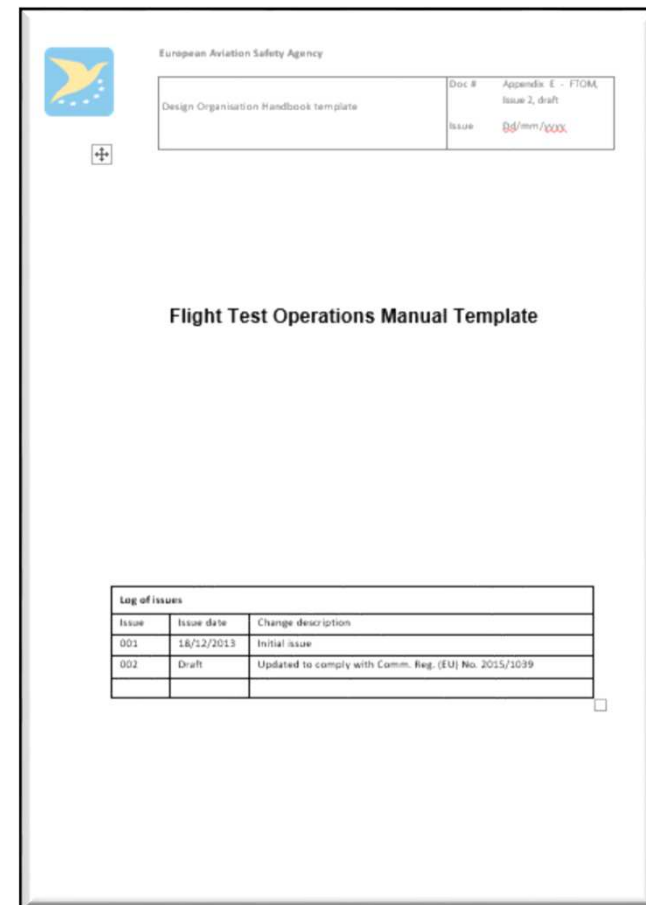
Need for LFTE

- No regulatory requirement to involve LFTE in flight testing
- To be specified by the DO's crewing policy



Need for specific Flight Test CVE

- CVE role is to check that compliance with specific airworthiness requirements has been demonstrated
- Flight Testing is no airworthiness requirement but a Means of Compliance
- No specific „Flight Test CVE“ is expected but CVEs for specific areas as e.g. „flight“, „performance“, „avionics“ etc.





Subcontracting

Use of „freelance flight crew“

- Definition of crew requirements (incl. currency)
- Procedure for selection and authorisation of flight crew
- Introduction to FTOM



Subcontracting

„full“ subcontracting

- DO retains responsibility for compliance with Part 21
- Subcontractor's FTOM to be assessed for compliance with 21.A.243(a)
- Subcontractor's FTOM to be assessed for compliance with DO's requirements
- Definition of interfaces
- Arrangement must cover DO's obligations (e.g. granting access to a/c, Agency participation to flight testing etc.)



Target date

- Timeframe to establish FTOM has been reduced from initially planned 12 months to < 2 months
- It is more important to have an appropriate FTOM than to meet a fixed date
- FTOM requirement, however, must be complied with for flight tests performed after 01/01/2016, i.e. FTOM shall be available before next flight test
- DO should provide a plan for providing the FTOM to the DOATL



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Purpose of FTOM

21.A.243(a)

If flight tests are to be conducted, a flight test operations manual **defining the organisation's policies and procedures in relation to flight test** shall be furnished. The flight test operations manual shall include:

- (i) a description of the **organisation's processes for flight test**, including the flight test organisation involvement into the permit to fly issuance process;
- (ii) **crewing policy**, including composition, competency, currency and flight time limitations, in accordance with Appendix XII to this Annex I (Part 21), where applicable;
- (iii) procedures for the **carriage of persons other than crew members** and for flight test training, when applicable;
- (iv) a policy for **risk and safety management** and associated methodologies;
- (v) procedures to identify the **instruments and equipment** to be carried;
- (vi) a list of **documents** that need to be produced for flight test.

see also [2013 presentation](#)