Appendix 7 to Opinion No 02/2019

Draft Annex X to draft Decision 201X/XXX/R

Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Commission Regulation (EU) No 965/2012

related to RMT.0695

The text of the amendment is arranged to show deleted, new or amended text as shown below:

1. deleted text is ~~struck through~~;
2. new or amended text is highlighted in blue;
3. an ellipsis (…) indicates that the rest of the text is unchanged.

ANNEX IV

COMMERCIAL AIR TRANSPORT OPERATIONS [PART-CAT]

SUBPART B

OPERATING PROCEDURES

SECTION 1

Motor-powered aircraft

AMC1 CAT.OP.MPA.140(d) Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval

OPERATION OF NON-ETOPS-COMPLIANT TWIN TURBO-JET AEROPLANES WITH MOPSC OF 19 OR LESS ~~AND MCTOM LESS THAN 45 360 KG~~ BETWEEN 120 AND 180 MINUTES FROM AN ADEQUATE AERODROME

(a) For operations between 120 and 180 minutes, ~~due account should be taken of the aeroplane's design and capabilities as outlined below and the operator's experience related to such operations.~~ the operator should include the relevant ~~Relevant~~ information ~~should be included~~ in ~~the~~ its operations manual and ~~the operator's~~ its maintenance procedures. ~~The term 'the aeroplane's design' in this AMC does not imply any additional type design approval specifications beyond the applicable original type certificate (TC) specifications.~~

(b) The aeroplane should be certified to CS-25 or equivalent (e.g. FAR-25).~~Systems capability~~

~~Aeroplanes should be certified to CS-25 as appropriate or equivalent (e.g. FAR-25). With respect to the capability of the aeroplane systems, the objective is that the aeroplane is capable of a safe diversion from the maximum diversion distance with particular emphasis on operations with OEI or with degraded system capability. To this end, the operator should give consideration to the capability of the following systems to support such a diversion:~~

~~1. Propulsion systems: the aeroplane engine should meet the applicable specifications prescribed in CS-25 and CS-E or equivalent (e.g. FAR-25, FAR-E), concerning engine TC, installation and system operation. In addition to the performance standards established by the Agency or competent authority at the time of engine certification, the engines should comply with all subsequent mandatory safety standards specified by the Agency or competent authority, including those necessary to maintain an acceptable level of reliability. In addition, consideration should be given to the effects of extended duration single engine operation (e.g. the effects of higher power demands such as bleed and electrical).~~

~~2. Airframe systems: with respect to electrical power, three or more reliable as defined by CS-25 or equivalent (e.g. FAR-25) and independent electrical power sources should be~~

~~available, each of which should be capable of providing power for all essential services which should at least include the following:~~

~~(i) sufficient instruments for the flight crew providing, as a minimum, attitude, heading, airspeed and altitude information;~~

~~(ii) appropriate pitot heating;~~

~~(iii) adequate navigation capability;~~

~~(iv) adequate radio communication and intercommunication capability;~~

~~(v) adequate flight deck and instrument lighting and emergency lighting;~~

~~(vi) adequate flight controls;~~

~~(vii) adequate engine controls and restart capability with critical type fuel (from the stand-point of flame-out and restart capability) and with the aeroplane initially at the maximum relight altitude;~~

~~(viii) adequate engine instrumentation;~~

~~(ix) adequate fuel supply system capability including such fuel boost and fuel transfer functions that may be necessary for extended duration single or dual-engine operation;~~

~~(x) such warnings, cautions and indications as are required for continued safe flight and landing;~~

~~(xi) fire protection (engines and auxiliary power unit (APU));~~

~~(xii) adequate ice protection including windshield de-icing; and~~

~~(xiii) adequate control of the flight crew compartment and cabin environment including heating and pressurisation.~~

~~The equipment including avionics necessary for extended diversion times should have the ability to operate acceptably following failures in the cooling system or electrical power systems.~~

~~For single-engine operations, the remaining power electrical, hydraulic, and pneumatic should continue to be available at levels necessary to permit continued safe flight and landing, and to provide those services necessary for the overall safety of the passengers and crew. As a minimum, following the failure of any two of the three electrical power sources, the remaining source should be capable of providing power for all of the items necessary for the duration of any diversion. If one or more of the required electrical power sources are provided by an APU, hydraulic system or air driven generator/ram air turbine (ADG/RAT), the following criteria should apply as appropriate:~~

~~(i) to ensure hydraulic power (hydraulic motor generator) reliability, it may be necessary to provide two or more independent energy sources;~~

~~(ii) the ADG/RAT, if fitted, should not require engine dependent power for deployment; and~~

~~(iii) the APU should meet the criteria in (b)(3).~~

~~(3) APU: the APU, if required for extended range operations, should be certified as an essential APU and should meet the applicable CS-25 and CS-APU provisions or equivalent (e.g. FAR-25).~~

~~(4) Fuel supply system: consideration should include the capability of the fuel supply system to provide sufficient fuel for the entire diversion taking account of aspects such as fuel boost and fuel transfer.~~

(c) Engine events and corrective action

(1) All engine events and operating hours should be reported by the operator to the airframe and engine ~~supplemental~~ type certificate (~~S~~TC) holders, as well as to the competent authority.

(2) These events should be evaluated by the operator in consultation with the competent authority and with the engine and airframe ~~(S)~~TC holders. The competent authority may consult the Agency to ensure that worldwide data is~~are~~ evaluated.

(3) Where statistical assessment alone is not applicable, e.g. where the fleet size or accumulated flight hours are small, individual engine events should be reviewed on a case-by-case basis.

(4) The evaluation or statistical assessment, when available, may result in corrective action or the application of operational restrictions.

(5) Engine events could include engine shutdowns, both on-ground and in-flight, excluding normal training events, including flameout, occurrences where the intended thrust level was not achieved or where crew action was taken to reduce thrust below the normal level for whatever reason, and unscheduled removals.

(6) The operator should ~~Arrangements to~~ ensure that all corrective actions required by the ~~Agency~~ competent authority are implemented.

(d) Maintenance

~~The maintenance programme in accordance with Annex I to Commission Regulation (EU) No 1321/2014[1] (Part-M) should be based upon reliability programmes including, but not limited to, the following elements:~~

~~(1) engine oil consumption programmes: such programmes are intended to support engine condition trend monitoring; and~~

~~(2) engine condition monitoring programme: a programme for each engine that monitors engine performance parameters and trends of degradation that provides for maintenance actions to be undertaken prior to significant performance loss or mechanical failure.~~

(1) The operator's oil-consumption-monitoring programme should be based on engine manufacturer's recommendations, if available, and track oil consumption trends. The monitoring should be continuous and take account of the oil added.

[1] Commission Regulation (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (OJ L 362, 17.12.2014, p. 1).

(2) The engine monitoring programme should also provide for engine condition monitoring describing the parameters to be monitored, the method of data collection and a corrective action process, and should be based on the engine manufacturer's instructions. This monitoring will be used to detect propulsion system deterioration at an early stage allowing corrective action to be taken before safe operation is affected.

(e) Flight crew training

The operator should establish a flight ~~Flight~~ crew training programme for this type of operation that ~~should~~ includes, in addition to the requirements of Subpart FC (Flight Crew) of Annex III (Part-ORO)~~(ORO.FC)~~, particular emphasis on the following:

(1) Fuel management: verifying required fuel on board prior to departure and monitoring fuel on board en-route, including calculation of fuel remaining. Procedures should provide for an independent cross-check of fuel quantity indicators, e.g. fuel flow may be used to calculate the fuel burned, which may be compared with the indicated fuel remaining. It should be confirmed that the fuel remaining is sufficient to satisfy the critical fuel reserves.

(2) Procedures for single and multiple failures in flight that may give rise to go/no-go and diversion decisions — policy and guidelines to aid the flight crew in the diversion decision-making process and emphasising the need for constant awareness of the closest weather-permissible alternate aerodrome in terms of time.

(3) OEI performance data: drift-down procedures and OEI service ceiling data.

(4) ~~Weather~~Meteorological reports and flight requirements: meteorological aerodrome reports (METARs) and terminal aerodrome forecast (TAF) reports and obtaining in-flight weather updates on the en-route alternate (ERA), destination and destination alternate aerodromes. Consideration should also be given to forecast winds, including the accuracy of the forecast compared to actual wind experienced during flight and meteorological conditions along the expected flight path at the OEI cruising altitude and throughout the approach and landing.

(f) Pre-departure check

A pre-departure check, additional to the pre-flight inspection required by Part-M and designed to verify the status of the aeroplane's significant systems, should be ~~reflected~~ conducted. Adequate status monitoring information on all significant systems should be available to the flight crew to conduct the pre-departure check. The content of the pre-departure check should be ~~and~~ described in the operations manual. The operator should ensure that flight ~~Flight~~ crew members ~~who are responsible for the pre-departure check of an aeroplane~~ ~~should~~ are~~be~~ fully trained and competent to conduct a pre-departure check of the aeroplane ~~do it~~. The operator's required training programme ~~required~~ should cover all relevant tasks, with particular emphasis on checking required fluid levels.

(g) MEL

The operator should establish in its MEL the minimum equipment that has to be serviceable for non-ETOPS operations between 120 and 180 minutes. The operator should ensure that the ~~The~~ MEL ~~should~~ takes into account all items specified by the manufacturer relevant to this type of operations ~~in accordance with this AMC~~.

(h) Dispatch/flight planning rules

The operator~~'s~~ should establish dispatch procedures ~~rules should~~ that address~~ing~~ the following:

(1) Fuel and oil supply: for releasing an aeroplane ~~should not be dispatched~~ on an extended range flight, the operator should ensure that ~~unless~~ it carries sufficient fuel and oil to meet ~~comply with~~ the applicable operational requirements and any additional ~~reserves~~ fuel that may be determined in accordance with the following:

(i) Critical fuel scenario: ~~—~~ in establishing the critical fuel reserves, the applicant is to determine the fuel necessary to fly to the most critical point of the route and execute a diversion to ~~the critical point is the furthest point from~~ an alternate aerodrome assuming a simultaneous failure of an engine and the cabin air pressurisation system. ~~For those aeroplanes that are type certificated to operate above flight level 450, the critical point is the furthest point from an alternate aerodrome assuming an engine failure.~~ The operator should carry additional fuel for the worst-case fuel burn condition (one engine vs two engines operating) if this is greater than the additional fuel calculated in accordance with the fuel requirements in CAT.OP.MPA, as follows, in order to:

(A) fly from the critical point to an alternate aerodrome:

(a) at 10 000 ft; or

(b) at 25 000 ft or the single-engine ceiling, whichever is lower, provided that all occupants can be supplied with and use oxygen for the time required to fly from the critical point to an alternate aerodrome; ~~or~~

~~(c) at the single-engine ceiling, provided that the aeroplane is type-certified to operate above flight level 450;~~

(B) descend and hold at 1 500 ft for 15 minutes in ~~international standard atmosphere (ISA)~~ standard conditions;

(C) descend to the applicable MDA/DH followed by a missed approach (taking into account the complete missed approach procedure); followed by

(D) a normal approach and landing.

(ii) Ice protection: additional fuel used when operating in icing conditions (e.g. operation of ice protection systems (engine/airframe as applicable)) and, when manufacturer's data is~~are~~ available, take account of ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during a diversion.

(iii) APU operation: if an APU has to be used to provide additional electrical power, consideration should be given to the additional fuel required.

(2) Communication facilities: the operator should ensure the availability of communications facilities in order to allow reliable two-way voice communications between the aeroplane and the appropriate ATC unit at OEI cruise altitudes.

(3) Aircraft technical log review to ensure that proper MEL procedures, deferred items, and required maintenance checks have been completed.

(4) ERA aerodrome(s): the operator should ensure ~~ensuring~~ that ERA aerodromes are available for the intended route, within the distance flown in 180 minutes based upon the OEI cruising speed, which is a speed within the certific~~at~~ed limits of the aeroplane, selected by the operator and approved by the competent authority, confirming that, based on the available meteorological information, the weather conditions at ERA aerodromes are at or above the applicable minima for the applicable period of time , in accordance with CAT.OP.MPA.185~~during which the aerodrome(s) may be used~~.

~~**Table 1:**~~

~~Planning minima~~

~~**Approach facility**~~	~~**Alternate aerodrome ceiling**~~	~~**Weather minima RVR/VIS**~~
~~PA~~	~~DA/H + 200 ft~~	~~RVR/VIS + 800 m~~
~~NPA~~ ~~Circling approach~~	~~MDA/H + 400 ft~~	~~RVR/VIS + 1 500 m~~

GM1 CAT.OP.MPA.140(d) Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval

SIGNIFICANT SYSTEMS

(a) Definition:

Significant systems to be checked are the aeroplane propulsion system and any other aeroplane systems whose failure could adversely affect the safety of a non-ETOPS diversion flight, or whose functioning is important to continued safe flight and landing during an aeroplane diversion.

(b) When defining the pre-departure check, the operator should give consideration, but not limited, to the following systems:

(1) electrical;

(2) hydraulic;

(3) pneumatic;

(4) flight instrumentation, including warning and caution systems;

(5) fuel, including potential leakage, fuel drains, fuel boost and fuel transfer;

(6) flight control;

(7) ice protection;

(8) engine start and ignition;

(9) propulsion system instruments;

(10) engine thrust reversers;

(11) navigation and communications, including any route specific long range navigation and communication equipment;

(12) back-up power systems (i.e. emergency generator and auxiliary power-unit);

(13) air conditioning and pressurisation;

(14) cargo fire detection and suppression;

(15) propulsion system fire detection and suppression;

(16) emergency equipment (e.g. ELT, hand fire extinguisher,…).

AMC 20-6 on Acceptable Means of Compliance and Guidance Material for Extended Range Operations with Two-Engined Aeroplanes ETOPS Certification and Operation

CHAPTER I GENERAL CONSIDERATIONS

SECTION 4: TERMINOLOGY

e. Extended Range Entry Point

The extended range entry point is the first point on the aeroplane's route which is:

- For two-engined aeroplanes with a maximum approved passenger seating configuration of 20 or more, ~~or with a maximum take-off mass of 45360 kg or more,~~ at 60 minutes flying time at the approved one-engine-inoperative cruise speed (under standard conditions in still air) from an adequate aerodrome.

- For two-engined aeroplanes with a maximum approved passenger seating configuration of 19 or less ~~and a maximum take-off mass of less than 45360 kg~~, at 180 minutes flying time at the approved one-engine-inoperative speed (in still air) from an adequate aerodrome.

(…)

Chapter III OPERATIONAL APPROVAL CONSIDERATIONS

Section 1: APPLICABILITY

This acceptable means of compliance is for operators seeking an ETOPS operational approval to operate either:

(1) ~~T~~two-engined aeroplanes with a maximum passenger seating configuration of 20 or more, ~~or with a maximum take-off mass of 45 360 kg or more~~, in excess of 60 minutes at the approved one-engine-inoperative speed (under standard conditions in still air) from an adequate aerodrome;

(2) or ~~T~~two-engined aeroplanes with a maximum passenger seating configuration of 19 or less ~~and a maximum take-off mass of less than 45 360 kg~~, in excess of 180 minutes at the approved one-engine-inoperative speed (in still air) from an adequate aerodrome.

(…)