

**Annex IV to ED Decision 2022/005/R****'AMC and GM to Annex IV (Part-CAT) to Commission Regulation (EU) No 965/2012 —  
Issue 2, Amendment 20'**

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

- deleted text is ~~struck through~~;
- new or amended text is highlighted in **blue**;
- an ellipsis '[...]' indicates that the rest of the text is unchanged.

**Note to the reader**

*In amended, and in particular in existing (that is, unchanged) text, 'Agency' is used interchangeably with 'EASA'. The interchangeable use of these two terms is more apparent in the consolidated versions. Therefore, please note that both terms refer to the 'European Union Aviation Safety Agency (EASA)'.*

The Annex to Decision 2014/015/R of 24 April 2014 of the Executive Director of the Agency is amended as follows:

**AMC1 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried****APPROPRIATE METEOROLOGICAL INFORMATION**

The appropriate meteorological information should be relevant to the planned operation, as specified in point (a) of point MET.TR.215 of Annex V (Part-MET) to Regulation (EU) 2017/373, and comprise the following:

- (a) the meteorological information that is specified in point (e) of point MET.TR.215 of Part-MET; and
- (b) supplemental meteorological information:
  - (1) information other than that specified in point (a), which should be based on data from certified meteorological service providers; or
  - (2) information from other reliable sources of meteorological information that should be evaluated by the operator.

**GM1 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried****DATA FROM CERTIFIED METEOROLOGICAL SERVICE PROVIDERS**

In the context of point (b)(1) of AMC1 CAT.GEN.MPA.180(a)(18), the operator may consider that any meteorological information that is provided by the organisation within the scope of the meteorological information included in the flight documentation defined in point (e) of point MET.TR.215 of Part-MET should originate only from authoritative sources or certified providers, and should not be transformed or tampered, except for the purpose of presenting the data in the correct format. The organisation's process should provide assurance that the integrity of such service is preserved in the data to be used by both flight crews and operators, regardless of their form.

**GM2 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried****INFORMATION FROM OTHER RELIABLE SOURCES OF METEOROLOGICAL INFORMATION**

In the context of point (b)(2) of AMC1 CAT.GEN.MPA.180(a)(18), reliable sources of meteorological information are organisations that are able to provide an appropriate level of data assurance in terms of accuracy and integrity. The operator may consider in the evaluation that the organisation has a quality assurance system in place that covers source selection, acquisition/import, processing, validity period check, and distribution phase of data.

**GM3 CAT.GEN.MPA.180(a)(18) Documents, manuals and information to be carried****SUPPLEMENTAL METEOROLOGICAL INFORMATION AND SUPPLEMENTARY INFORMATION**

Supplemental meteorological information: when operating under specific provisions and without the meteorological information from a certified service provider, the operator should use 'supplemental meteorological information', such as digital imagery. Related information can be found in point (e)(4) of AMC1 CAT.OP.MPA.192.

Supplementary information: it is included in point (a) of AMC1 CAT.GEN.MPA.180(a)(18) and refers to meteorological information to be reported in specific cases such as freezing precipitation, blowing snow, thunderstorm, etc.

## GM1 CAT.OP.MPA.107 Adequate aerodrome

### VERIFICATION OF WEATHER CONDITIONS

This GM clarifies the difference between ‘adequate aerodrome’ and ‘weather-permissible aerodrome’. The two concepts are complementary:

- ‘adequate aerodrome’: see definition in Annex I (Definitions for terms used in Annexes II to VIII) and point CAT.OP.MPA.107 of Annex IV (Part-CAT) to Regulation (EU) No 965/2012; and
- ‘weather-permissible aerodrome’ means an adequate aerodrome with additional requirements: see definition in Annex I (Definitions for terms used in Annexes II to VIII).

Weather conditions are not required to be considered at an adequate aerodrome.

### RESCUE AND FIREFIGHTING SERVICES (RFFS)

Guidance on the assessment of the level of an aerodrome’s RFFS may be found in Attachment I to ICAO Annex 6 Part I.

## AMC1 CAT.OP.MPA.150(b) Fuel policy

### PLANNING CRITERIA — AEROPLANES

The operator should base the defined fuel policy, including calculation of the amount of fuel to be on board for departure, on the following planning criteria:

#### (a) — Basic procedure

The usable fuel to be on board for departure should be the sum of the following:

- (1) — Taxi fuel, which should not be less than the amount expected to be used prior to take-off. Local conditions at the departure aerodrome and auxiliary power unit (APU) consumption should be taken into account.
- (2) — Trip fuel, which should include:
  - (i) — fuel for take off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;
  - (ii) — fuel from top of climb to top of descent, including any step climb/descent;
  - (iii) — fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and
  - (iv) — fuel for approach and landing at the destination aerodrome.
- (3) — Contingency fuel, except as provided for in (b), which should be the higher of:
  - (i) — Either:
    - (A) — 5 % of the planned trip fuel or, in the event of in-flight replanning, 5 % of the trip fuel for the remainder of the flight;

- ~~(B) — not less than 3 % of the planned trip fuel or, in the event of in-flight replanning, 3 % of the trip fuel for the remainder of the flight, provided that an en-route alternate (ERA) aerodrome is available;~~
- ~~(C) — an amount of fuel sufficient for 20 minutes flying time based upon the planned trip fuel consumption, provided that the operator has established a fuel consumption monitoring programme for individual aeroplanes and uses valid data determined by means of such a programme for fuel calculation; or~~
- ~~(D) — an amount of fuel based on a statistical method that ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel. This method is used to monitor the fuel consumption on each city pair/aeroplane combination and the operator uses this data for a statistical analysis to calculate contingency fuel for that city pair/aeroplane combination;~~
- ~~(ii) — or an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m), above the destination aerodrome in standard conditions.~~
- ~~(4) — Alternate fuel, which should:~~
  - ~~(i) — include:~~
    - ~~(A) — fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;~~
    - ~~(B) — fuel for climb from missed approach altitude to cruising level/altitude, taking into account the expected departure routing;~~
    - ~~(C) — fuel for cruise from top of climb to top of descent, taking into account the expected routing;~~
    - ~~(D) — fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and~~
    - ~~(E) — fuel for executing an approach and landing at the destination alternate aerodrome;~~
  - ~~(ii) — where two destination alternate aerodromes are required, be sufficient to proceed to the alternate aerodrome that requires the greater amount of alternate fuel.~~
- ~~(5) — Final reserve fuel, which should be:~~
  - ~~(i) — for aeroplanes with reciprocating engines, fuel to fly for 45 minutes; or~~
  - ~~(ii) — for aeroplanes with turbine engines, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions, calculated with the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required.~~
- ~~(6) — The minimum additional fuel, which should permit:~~
  - ~~(i) — the aeroplane to descend as necessary and proceed to an adequate alternate aerodrome in the event of engine failure or loss of pressurisation, whichever~~

~~requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route, and~~

~~(A) — hold there for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and~~

~~(B) — make an approach and landing,~~

~~except that additional fuel is only required if the minimum amount of fuel calculated in accordance with (a)(2) to (a)(5) is not sufficient for such an event; and~~

~~(ii) — holding for 15 minutes at 1 500 ft (450 m) above destination aerodrome elevation in standard conditions, when a flight is operated without a destination alternate aerodrome.~~

~~(7) — Extra fuel, which should be at the discretion of the commander.~~

~~(b) — Reduced contingency fuel (RCF) procedure~~

~~If the operator's fuel policy includes pre-flight planning to a destination 1 aerodrome (commercial destination) with an RCF procedure using a decision point along the route and a destination 2 aerodrome (optional refuel destination), the amount of usable fuel, on board for departure, should be the greater of (b)(1) or (b)(2):~~

~~(1) — The sum of:~~

~~(i) — taxi fuel;~~

~~(ii) — trip fuel to the destination 1 aerodrome, via the decision point;~~

~~(iii) — contingency fuel equal to not less than 5 % of the estimated fuel consumption from the decision point to the destination 1 aerodrome;~~

~~(iv) — alternate fuel or no alternate fuel if the decision point is at less than 6 hours from the destination 1 aerodrome and the requirements of CAT.OP.MPA.180(b)(2), are fulfilled;~~

~~(v) — final reserve fuel;~~

~~(vi) — additional fuel; and~~

~~(vii) — extra fuel if required by the commander.~~

~~(2) — The sum of:~~

~~(i) — taxi fuel;~~

~~(ii) — trip fuel to the destination 2 aerodrome, via the decision point;~~

~~(iii) — contingency fuel equal to not less than the amount calculated in accordance with (a)(3) above from departure aerodrome to the destination 2 aerodrome;~~

~~(iv) — alternate fuel, if a destination 2 alternate aerodrome is required;~~

~~(v) — final reserve fuel;~~

~~(vi) — additional fuel; and~~

~~(vii) — extra fuel if required by the commander.~~

~~(c) — Predetermined point (PDP) procedure~~

~~If the operator's fuel policy includes planning to a destination alternate aerodrome where the distance between the destination aerodrome and the destination alternate aerodrome is such that a flight can only be routed via a predetermined point to one of these aerodromes, the amount of usable fuel, on board for departure, should be the greater of (c)(1) or (c)(2):~~

~~(1) — The sum of:~~

- ~~(i) — taxi fuel;~~
- ~~(ii) — trip fuel from the departure aerodrome to the destination aerodrome, via the predetermined point;~~
- ~~(iii) — contingency fuel calculated in accordance with (a)(3);~~
- ~~(iv) — additional fuel if required, but not less than:
  - ~~(A) — for aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15 % of the flight time planned to be spent at cruising level or 2 hours, whichever is less; or~~
  - ~~(B) — for aeroplanes with turbine engines, fuel to fly for 2 hours at normal cruise consumption above the destination aerodrome, this should not be less than final reserve fuel; and~~~~
- ~~(v) — extra fuel if required by the commander.~~

~~(2) — The sum of:~~

- ~~(i) — taxi fuel;~~
- ~~(ii) — trip fuel from the departure aerodrome to the destination alternate aerodrome, via the predetermined point;~~
- ~~(iii) — contingency fuel calculated in accordance with (a)(3);~~
- ~~(iv) — additional fuel if required, but not less than:
  - ~~(A) — for aeroplanes with reciprocating engines: fuel to fly for 45 minutes; or~~
  - ~~(B) — for aeroplanes with turbine engines: fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination alternate aerodrome elevation in standard conditions, this should not be less than final reserve fuel; and~~~~
- ~~(v) — extra fuel if required by the commander.~~

~~(d) — Isolated aerodrome procedure~~

~~If the operator's fuel policy includes planning to an isolated aerodrome, the last possible point of diversion to any available en-route alternate (ERA) aerodrome should be used as the predetermined point.~~

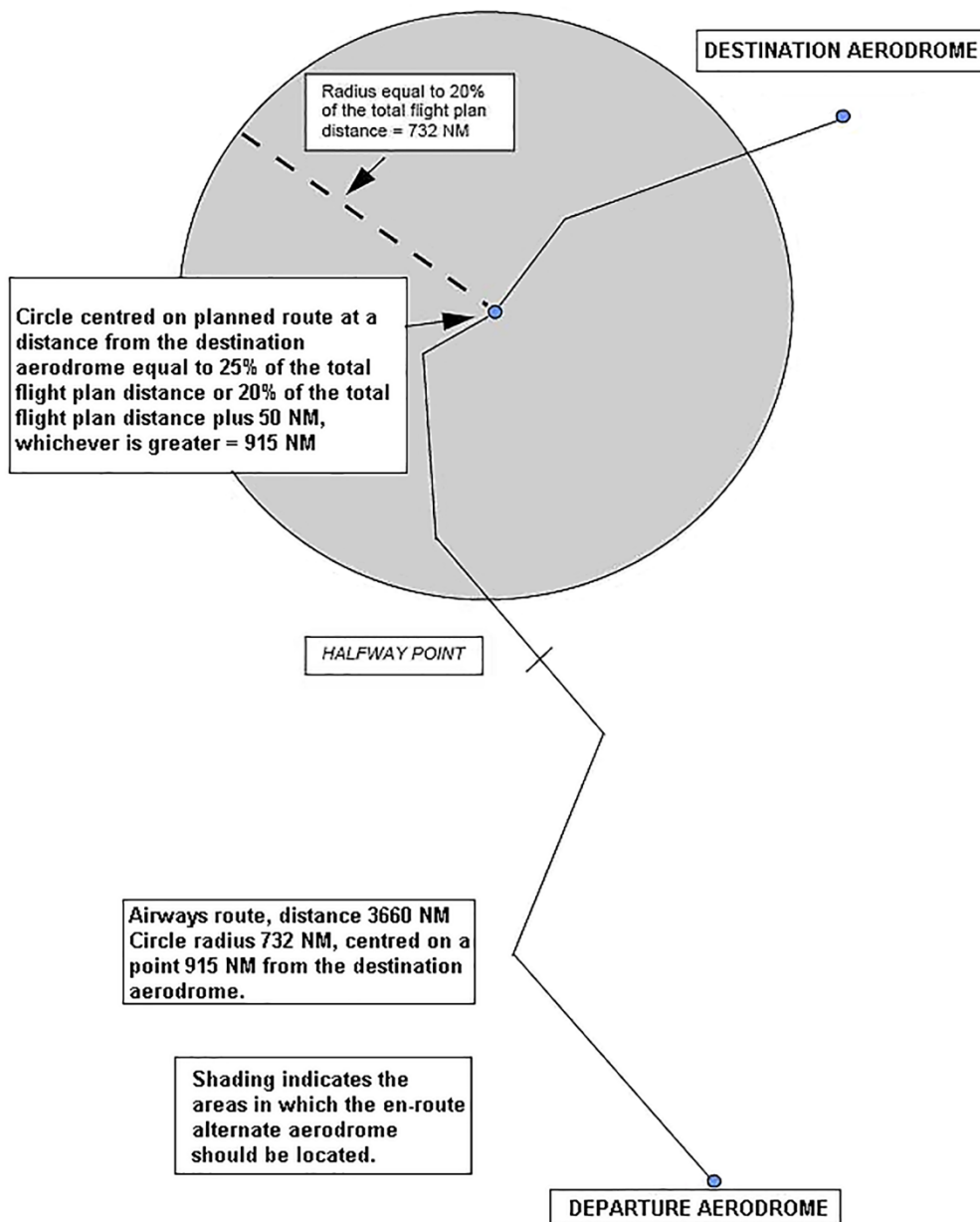
## **AMC2-CAT.OP.MPA.150(b) Fuel policy**

### **LOCATION OF THE FUEL EN-ROUTE ALTERNATE (FUEL-ERA) AERODROME**

- ~~(a) — The fuel ERA aerodrome should be located within a circle having a radius equal to 20 % of the total flight plan distance, the centre of which lies on the planned route at a distance from the destination aerodrome of 25 % of the total flight plan distance, or at least 20 % of the total flight plan distance plus 50 NM, whichever is greater. All distances should be calculated in still air conditions (see Figure 1).~~

**Figure 1**

Location of the fuel ERA aerodrome for the purposes of reducing contingency fuel to 3%



### AMC3-CAT.OP.MPA.150(b) Fuel policy

#### PLANNING CRITERIA — HELICOPTERS

The operator should base the company fuel policy, including calculation of the amount of fuel to be carried, on the following planning criteria:

(a) — The amount of:

- (1) — taxi fuel, which should not be less than the amount expected to be used prior to take-off. Local conditions at the departure site and APU consumption should be taken into account;



- ~~(2) — trip fuel, which should include fuel:~~
    - ~~(i) — for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;~~
    - ~~(ii) — from top of climb to top of descent, including any step climb/descent;~~
    - ~~(iii) — from top of descent to the point where the approach procedure is initiated, taking into account the expected arrival procedure; and~~
    - ~~(iv) — for approach and landing at the destination site;~~
  - ~~(3) — contingency fuel, which should be:~~
    - ~~(i) — for IFR flights, or for VFR flights in a hostile environment, 10 % of the planned trip fuel; or~~
    - ~~(ii) — for VFR flights in a non-hostile environment, 5 % of the planned trip fuel;~~
  - ~~(4) — alternate fuel, which should be:~~
    - ~~(i) — fuel for a missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;~~
    - ~~(ii) — fuel for a climb from missed approach altitude to cruising level/altitude;~~
    - ~~(iii) — fuel for the cruise from top of climb to top of descent;~~
    - ~~(iv) — fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure;~~
    - ~~(v) — fuel for executing an approach and landing at the destination alternate selected in accordance with CAT.OP.MPA.181; and~~
    - ~~(vi) — for helicopters operating to or from helidecks located in a hostile environment, 10 % of (a)(4)(i) to (v);~~
  - ~~(5) — final reserve fuel, which should be:~~
    - ~~(i) — for VFR flights navigating by day with reference to visual landmarks, 20 minutes' fuel at best range speed; or~~
    - ~~(ii) — for IFR flights or when flying VFR and navigating by means other than by reference to visual landmarks or at night, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions calculated with the estimated mass on arrival above the alternate, or the destination, when no alternate is required;~~

~~and~~
  - ~~(6) — extra fuel, which should be at the discretion of the commander.~~
- ~~(b) — Isolated aerodrome IFR procedure~~
- ~~If the operator's fuel policy includes planning to an isolated aerodrome flying IFR, or when flying VFR and navigating by means other than by reference to visual landmarks, for which a destination alternate does not exist, the amount of fuel at departure should include:~~

- ~~(1) — taxi fuel;~~
  - ~~(2) — trip fuel;~~
  - ~~(3) — contingency fuel calculated in accordance with (a)(3);~~
  - ~~(4) — additional fuel to fly for 2 hours at holding speed, including final reserve fuel; and~~
  - ~~(5) — extra fuel at the discretion of the commander.~~
- ~~(c) — Sufficient fuel should be carried at all times to ensure that following the failure of an engine occurring at the most critical point along the route, the helicopter is able to: —~~
- ~~(1) — descend as necessary and proceed to an adequate aerodrome;~~
  - ~~(2) — hold there for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and~~
  - ~~(3) — make an approach and landing.~~

### **GM1-CAT.OP.MPA.150(b) Fuel policy**

#### **CONTINGENCY FUEL STATISTICAL METHOD — AEROPLANES**

- ~~(a) — As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel provide appropriate statistical coverage:~~
- ~~(1) — 99 % coverage plus 3 % of the trip fuel, if the calculated flight time is less than 2 hours, or more than 2 hours and no weather-permissible ERA aerodrome is available.~~
  - ~~(2) — 99 % coverage if the calculated flight time is more than 2 hours and a weather-permissible ERA aerodrome is available.~~
  - ~~(3) — 90 % coverage if:~~
    - ~~(i) — the calculated flight time is more than 2 hours;~~
    - ~~(ii) — a weather-permissible ERA aerodrome is available; and~~
    - ~~(iii) — at the destination aerodrome two separate runways are available and usable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with CAT.OP.MPA.180(b)(2), or the ILS/MLS is operational to CAT II/III operating minima and the weather conditions are at or above 500 ft.~~
- ~~(b) — The fuel consumption database used in conjunction with these values should be based on fuel consumption monitoring for each route/aeroplane combination over a rolling 2-year period.~~

### **GM1-CAT.OP.MPA.150(c)(3)(i) Fuel policy**

#### **CONTINGENCY FUEL**

~~Factors that may influence fuel required on a particular flight in an unpredictable way include deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions and deviations from planned routings and/or cruising levels/altitudes.~~

**GM1-CAT.OP.MPA.150(c)(3)(ii) Fuel policy****DESTINATION ALTERNATE AERODROME**

~~The departure aerodrome may be selected as the destination alternate aerodrome.~~

**AMC1 CAT.OP.MPA.175(a) Flight preparation****OPERATIONAL FLIGHT PLAN — COMPLEX MOTOR-POWERED AIRCRAFT**

- (a) The operational flight plan used and the entries made during flight should contain the following items:
- (1) aircraft registration;
  - [...]
  - (13) planned cruising speed and flying times between check-points/waypoints (estimated, revised, and actual times overhead);
  - [...]
  - (18) alternate(s) for destination, ~~and, where applicable, take-off and en-route,~~ including the information required in (a)(12) to (15), as well as destination 2 and destination 2 alternate aerodromes in case of a reduced contingency fuel (RCF) procedure;
  - (19) where applicable, a take-off alternate and fuel ERA aerodrome(s);
  - ~~(19)~~(20) initial ATS flight plan clearance and subsequent reclearance;
  - ~~(20)~~(21) in-flight replanning calculations; and
  - ~~(21)~~(22) ~~relevant~~ meteorological information, as specified in point (a) of point MET.TR.215 of Part-MET.
- (b) Items that are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.
- [...]

**OPERATIONAL FLIGHT PLAN — OTHER-THAN-COMPLEX MOTOR-POWERED AIRCRAFT OPERATIONS AND LOCAL OPERATIONS**

- (e) An operational flight plan may be established in a simplified form relevant to the ~~kind-type~~ of operation for operations with other-than-complex motor-powered aircraft as well as local operations with any aircraft. Local operations should be defined in the OM.

**OPERATIONAL FLIGHT PLAN — HELICOPTERS OPERATED WITH A SINGLE PILOT AND WITHOUT A STABILITY AUGMENTATION SYSTEM OR AN AUTOMATIC FLIGHT CONTROL SYSTEM (AFCS)**

- (f) No entries should be made in the operational flight plan during the flight.

**OPERATIONAL FLIGHT PLAN PRODUCED BY A COMPUTERISED FLIGHT-PLANNING SYSTEM**

- (g) When the operator uses a computerised flight-planning system to produce an operational flight plan, the functionality of this system should be described in the OM.
- (h) If the computerised flight-planning system is used in conjunction with a basic fuel scheme with variations or an individual fuel scheme, the operator should ensure that the quality and the

proper functionality of the software are tested after each upgrade. The test should verify that the changes to the software do not affect the final output.

#### AMC1 CAT.OP.MPA.177 Submission of the ATS flight plan

##### FLIGHTS WITHOUT AN ATS FLIGHT PLAN

- (a) When unable to submit or close the ATS flight plan due to lack of ATS facilities or of any other means of communications to ATS, the operator should establish procedures, instructions, and a list of nominated persons to be responsible for alerting search and rescue (SAR) services.
- (b) To ensure that each flight is located at all times, these instructions should:
- (1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date, and estimated time for re-establishing communications;
  - (2) if an aircraft is overdue or missing, ensure that the appropriate ATS or SAR service is notified; and
  - (3) ensure that the information will be retained at a designated place until the completion of the flight.

#### AMC1 CAT.OP.MPA.180 Fuel/energy scheme — aeroplanes

##### INDIVIDUAL FUEL SCHEME

- (a) Prior to submitting an individual fuel scheme for approval, the operator should perform all the following actions to establish a baseline safety performance:
- (1) measure the baseline safety performance of its operation with the current fuel scheme by:
    - (i) selecting safety performance indicators (SPIs) and targets that are agreed with the competent authority; and
    - (ii) collecting statistically relevant data for a period of at least 2 years of continuous operation (note: the number of flights should be sufficient to provide data to support the intended deviation);
  - (2) identify the hazards associated with the individual fuel scheme and carry out a safety risk assessment of these hazards; and
  - (3) based on this safety risk assessment, establish a mechanism for risk monitoring and risk control to ensure an equivalent level of safety to that of the current fuel scheme.
- (b) In order to ensure the approval of the competent authority and its continuous oversight, the operator should establish an effective continuous reporting system to the competent authority on the safety performance and regulatory compliance of the individual fuel scheme.
- (c) When determining the extent of the deviation from the current fuel scheme, the operator should take into account at least the following elements for the relevant area of operation:
- (1) the available aerodrome technologies, capabilities, and infrastructure;
  - (2) the reliability of meteorological and aerodrome information;

- (3) the reliability of the aeroplane systems, especially the time-limited ones; and
  - (4) the type of ATS provided and, where applicable, characteristics and procedures of the air traffic flow management and of the airspace management.
- (d) An operator wishing to apply for the approval of an individual fuel scheme should be able to demonstrate that it exercises sufficient organisational control over internal processes and the use of resources. The operator should adapt its management system to ensure that:
- (1) processes and procedures are established to support the individual fuel scheme;
  - (2) involved flight crew and personnel are trained and competent to perform their tasks; and
  - (3) the implementation and effectiveness of such processes, procedures, and training are monitored.
- (e) The operator should have as a minimum the following operational capabilities that support the implementation of an individual fuel scheme:
- (1) use a suitable computerised flight-planning system;
  - (2) ensure that the planning of flights is based upon current aircraft-specific data that is derived from a fuel consumption monitoring system and reliable meteorological data;
  - (3) have airborne fuel prediction systems;
  - (4) be able to operate in required navigation performance (RNP) 4 oceanic and remote continental airspace and in area navigation (RNAV) 1 continental en-route airspace, as applicable;
  - (5) be able to perform APCHs that require an LVO approval and RNP APCHs down to VNAV minima; and
  - (6) update the available landing options by establishing an operational control system with the following capabilities:
    - (i) flight monitoring or flight watch;
    - (ii) collection and continuous monitoring of reliable meteorological, aerodrome, and traffic information;
    - (iii) two independent airborne communications systems to achieve rapid and reliable exchange of relevant safety information between flight operations personnel and flight crew during the entire flight; and
    - (iv) monitoring of the status of aircraft systems that affect fuel consumption and of ground and aircraft systems that affect landing capabilities.
- (f) After receiving the approval, the operator should:
- (1) continually measure and monitor the outcome of each SPI; and
  - (2) in case of degradation of any SPI:
    - (i) assess the root cause of the degradation;
    - (ii) identify remedial actions to restore the baseline safety performance; and

- (iii) when the associated safety performance target is not met, inform the authority as soon as practicable.

**GM1 CAT.OP.MPA.180 Fuel/energy scheme — aeroplanes****FUEL SCHEMES**

An operator can choose between three different fuel schemes. For the development of each fuel scheme, the following AMC are applicable:

- (a) Basic fuel scheme: all the AMC that apply to the basic fuel scheme.
- (b) Basic fuel scheme with variations: when an operator decides to deviate fully or partly from the basic fuel schemes, the AMC for basic fuel schemes with variations apply to the specific deviation.
- (c) Individual fuel scheme: when an operator wishes to apply an individual fuel scheme, the AMC for the individual fuel scheme apply; for the part of the scheme where the operator still follows the basic fuel scheme, the operator should apply the AMC referred to in (a) and (b).

**GM2 CAT.OP.MPA.180 Fuel/energy scheme — aeroplanes****INDIVIDUAL FUEL SCHEMES — BASELINE SAFETY PERFORMANCE INDICATORS (SPIs) AND EQUIVALENT LEVEL OF SAFETY**

- (a) Establishing the baseline safety performance of a current fuel scheme involves collecting historical statistical data for the selected SPIs over a defined period of time, e.g. a minimum of 2 years. The safety performance of the operator's processes is then measured against this baseline safety performance before and after implementation of the individual fuel scheme.
- (b) Agreed SPIs should be commensurate with the complexity of the operational context, the extent of the deviations of the individual fuel scheme from the current fuel scheme, and the availability of resources to address those SPIs.
- (c) The following is a non-exhaustive list of SPIs that are used to measure the baseline safety performance:
  - (1) flights with 100 % consumption of the contingency fuel;
  - (2) flights with a percentage consumption of the contingency fuel (e.g. 85 %), as agreed by the operator and the competent authority;
  - (3) difference between planned and actual trip fuel;
  - (4) landings with less than the final reserve fuel (FRF) remaining;
  - (5) flights landing with less than minutes of fuel remaining (e.g. 45 minutes), as agreed by the operator and the competent authority;
  - (6) 'MINIMUM FUEL' declarations;
  - (7) 'MAYDAY MAYDAY MAYDAY FUEL' declarations;
  - (8) in-flight re-planning to the planned destination due to fuel shortage, including committing to land at the destination by cancelling the planned destination alternate;
  - (9) diversion to an en route alternate (ERA) aerodrome to protect the FRF;

- (10) diversion to the destination alternate aerodrome; and
- (11) any other indicator with the potential of demonstrating the suitability or unsuitability of the alternate aerodrome and fuel planning policy.

Note: Although the above-list includes quantitative SPIs, for certain non-data-based monitoring SPIs, alert and target levels may be qualitative in nature.

- (d) Equivalent level of safety: SPIs and associated targets that are achieved after the introduction of an individual fuel scheme 'should be equivalent to' or 'exceed' the SPIs and associated targets that were used in the previously approved fuel scheme. To determine if such equivalence is achieved, the operator should carefully compare with one another the safety performance of operational activities before and after the application of the individual fuel scheme. For example, the operator should ensure that the average number of landings with less than the FRF does not increase after the introduction of the individual fuel scheme.
- (e) The applicability of the individual fuel scheme may be limited to a specific aircraft fleet or type/variant of aircraft or area of operations. Different policies may be established as long as the procedures clearly specify the boundaries of each policy so that the flight crew is aware of the policy being applied: for example, the operator may wish to deviate from the basic 5 % contingency fuel policy only in certain areas of operations or only for a specific aircraft fleet or type/variant of aircraft. The safety performance of the fuel scheme may be measured according to the relevant area of operation or aircraft fleet or type/variant of aircraft so that any degradation of the safety performance can be isolated and mitigated separately. In that case, the approval for a deviation may be suspended for the affected area of operations and/or type/variant of aircraft until the required safety performance is achieved.

Note: ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual* (1st Edition, 2015) and the *EASA Fuel Manual* provide further guidance.

### GM3 CAT.OP.MPA.180 Fuel/energy scheme — aeroplanes

#### INDIVIDUAL FUEL SCHEMES — OPERATOR CAPABILITIES — COMMUNICATIONS SYSTEMS

- (a) In the context of point (e)(6) of AMC1 CAT.OP.MPA.180, the availability of two independent communications systems at dispatch is particularly relevant for flights over oceanic and remote areas (e.g. when flying over the ocean without VHF coverage, operators need either HF or satellite communications (SATCOM)).
- (b) Consideration should also be given to the operational control system associated with the use of the aircraft communications addressing and reporting system (ACARS). Two communications systems (e.g. VHF and SATCOM) should be used to support the ACARS functionality to ensure the required degree of independence unless the operator has established contingency procedures for reverting to voice communication only.
- (c) Additional means of communications may be required by other regulations that are not linked to fuel schemes.

Note: For further information, see ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual*, Appendix 7 to Chapter 5 *A performance-based approach job-aid for an approving authority* (1st Edition, 2015).

**AMC1 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes****BASIC FUEL SCHEME — PRE-FLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES**

For the pre-flight calculation of the usable fuel in accordance with point CAT.OP.MPA.181, the operator should:

- (a) for taxi fuel, take into account the local conditions at the departure aerodrome and the APU consumption;
- (b) for trip fuel, include:
  - (1) fuel for take-off and climb from the aerodrome elevation to the initial cruising level/altitude, taking into account the expected departure routing;
  - (2) fuel from the top of climb to the top of descent, including any step climb/descent;
  - (3) fuel from the top of descent to the point where the approach procedure is initiated, taking into account the expected arrival routing; and
  - (4) fuel for making an approach and landing at the destination aerodrome;
- (c) for contingency fuel, calculate for unforeseen factors either:
  - (1) 5 % of the planned trip fuel or, in the event of in-flight re-planning, 5 % of the trip fuel for the remainder of the flight; or
  - (2) an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions,whichever is the higher;
- (d) for destination alternate fuel, include:
  - (1) when the aircraft is operated with one destination alternate aerodrome:
    - (i) fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to the missed-approach altitude, taking into account the complete missed-approach procedure;
    - (ii) fuel for climb from the missed-approach altitude to the cruising level/altitude, taking into account the expected departure routing;
    - (iii) fuel for cruising from the top of climb to the top of descent, taking into account the expected routing;
    - (iv) fuel for descent from the top of descent to the point where the approach is initiated, taking into account the expected arrival routing; and
    - (v) fuel for making an approach and landing at the destination alternate aerodrome; and
  - (2) when the aircraft is operated with two destination alternate aerodromes, the amount of fuel that is calculated in accordance with point (d)(1), based on the destination alternate aerodrome that requires the greater amount of fuel;
- (e) for FRF, comply with point CAT.OP.MPA.181(c);



- (f) for additional fuel, include an amount of fuel that allows the aeroplane to proceed, in the event of an engine failure or loss of pressurisation, from the most critical point along the route to a fuel en route alternate (fuel ERA) aerodrome in the relevant aircraft configuration, hold there for 15 minutes at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, make an approach, and land;
- (g) for extra fuel, include anticipated delays or specific operational constraints that can be predicted; and
- (h) for discretionary fuel, include a quantity at the sole discretion of the commander.

### AMC2 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

#### **BASIC FUEL SCHEME — PRE-FLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS B and C AEROPLANES**

The pre-flight calculation of required usable fuel should include:

- (a) taxi fuel, if significant;
- (b) trip fuel;
- (c) contingency fuel that is not less than 5 % of the planned trip fuel, or in the event of in-flight re-planning, 5 % of the trip fuel for the remainder of the flight;
- (d) alternate fuel to reach the destination alternate aerodrome via the destination if a destination alternate aerodrome is required;
- (e) FRF to comply with point CAT.OP.MPA.181(c);
- (f) extra fuel if there are anticipated delays or specific operational constraints; and
- (g) discretionary fuel, if required by the commander.

The operating conditions may include rounded-up figures of fuel for all flights.

### AMC3 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

#### **BASIC FUEL SCHEME — PRE-FLIGHT CALCULATION OF USABLE FUEL FOR ELA2 AEROPLANES**

For operations, take-off, and landing at the same aerodrome or operating site under VFR by day, operators should specify the minimum FRF in the OM. This FRF should not be less than the amount needed to fly for a period of 45 minutes. The operating conditions may be rounded up to a single figure of fuel for all flights. For the pre-flight calculation of the required usable fuel, a single rounded-up figure for the particular flight is needed, which includes trip fuel, contingency fuel, extra fuel, discretionary fuel, and alternate fuel, to reach a destination alternate aerodrome if such an aerodrome is required.

**AMC4 CAT.OP.MPA.181 Fuel/energy scheme — Fuel/energy planning and in-flight re-planning policy — aeroplanes****BASIC FUEL SCHEME — PRE-FLIGHT CALCULATION OF USABLE FUEL**

The additional fuel required by the type of operation in the event of an aircraft failure that significantly increases fuel consumption at the most critical point along the route should be calculated according to the engine failure or loss of pressurisation, whichever requires a greater amount of fuel.

**GM1-CAT.OP.MPA.181 Selection of aerodromes and operating sites — helicopters****LANDING FORECAST**

- ~~(a) — Meteorological data have been specified that conform to the standards contained in the Regional Air Navigation Plan and ICAO Annex 3. As the following meteorological data are point-specific, caution should be exercised when associating it with nearby aerodromes (or helidecks).~~
- ~~(b) — Meteorological reports (METARs)~~
- ~~(1) — Routine and special meteorological observations at offshore installations should be made during periods and at a frequency agreed between the meteorological authority and the operator concerned. They should comply with the provisions contained in the meteorological section of the ICAO Regional Air Navigation Plan, and should conform to the standards and recommended practices, including the desirable accuracy of observations, promulgated in ICAO Annex 3.~~
- ~~(2) — Routine and selected special reports are exchanged between meteorological offices in the METAR or SPECI (aviation selected special weather report) code forms prescribed by the World Meteorological Organisation.~~
- ~~(c) — Aerodrome forecasts (TAFs)~~
- ~~(1) — The aerodrome forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or aerodrome during a specified period of validity, which is normally not less than 9 hours, or more than 24 hours in duration. The forecast includes surface wind, visibility, weather and cloud, and expected changes of one or more of these elements during the period. Additional elements may be included as agreed between the meteorological authority and the operators concerned. Where these forecasts relate to offshore installations, barometric pressure and temperature should be included to facilitate the planning of helicopter landing and take-off performance.~~
- ~~(2) — Aerodrome forecasts are most commonly exchanged in the TAF code form, and the detailed description of an aerodrome forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy elements. In particular, the observed cloud height should remain within  $\pm 30\%$  of the forecast value in 70 % of cases, and the observed visibility should remain within  $\pm 30\%$  of the forecast value in 80 % of cases.~~
- ~~(d) — Landing forecasts (TRENDS)~~
- ~~(1) — The landing forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or aerodrome during the two-hour~~

~~period immediately following the time of issue. It contains surface wind, visibility, significant weather and cloud elements and other significant information, such as barometric pressure and temperature, as may be agreed between the meteorological authority and the operators concerned.~~

~~(2) The detailed description of the landing forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within  $\pm 30\%$  of the forecast values in 90% of the cases.~~

~~(3) Landing forecasts most commonly take the form of routine or special selected meteorological reports in the METAR code, to which either the code words 'NOSIG', i.e. no significant change expected; 'BECMG' (becoming), or 'TEMPO' (temporarily), followed by the expected change, are added. The 2-hour period of validity commences at the time of the meteorological report.~~

## GM1 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

### BASIC FUEL SCHEME

#### TAXI FUEL — LOCAL CONDITIONS

(a) Local conditions, as referred to in point (a) of AMC1 CAT.OP.MPA.181, include NOTAMS, meteorological conditions (e.g. winter operations), ATS procedures (e.g. LVP, collaborative decision-making (CDM)), and any anticipated delay(s).

#### PLANNING OF FLIGHTS

(b) A flight should be planned by using the most accurate information available. If aircraft-specific data that is derived from a fuel consumption monitoring system is available, this data is used in preference to data that is provided by the aircraft manufacturer. Data that is provided by the aircraft manufacturer should be used only in specific cases, e.g. when introducing a new aircraft type into service.

#### FUEL CONSUMPTION MONITORING SYSTEM

(c) Extensive guidance on a fuel consumption monitoring system is provided in ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual*, Appendix 5 to Chapter 5 *Example of a fuel consumption monitoring (FCM) programme* (1st Edition, 2015). As a basic requirement, the fuel consumption monitoring system (commonly referred to as 'hull-specific fuel bias') is a process of comparing an aeroplane's achieved in-flight performance to an aeroplane's predicted performance. Variations between the achieved performance and the predicted performance result in a variation of the fuel consumption rate, which should be accounted for by the operator during flight planning and in-flight re-planning.

The fuel consumption monitoring system is used to determine an individual aeroplane's performance in comparison with its predicted one. In no case, should data that is collected from one aeroplane be used as a basis for varying another aeroplane's performance figures away from the predicted values.

The data that is collected and used to determine an aeroplane's actual performance should be collected in a manner acceptable to the competent authority. The operator should demonstrate that the data collected during in-service operation of the aeroplane is accurate. Where possible, the data should be collected automatically; however, manual recording of data does not preclude an operator from participating in a fuel consumption monitoring system.

#### ANTICIPATED MASSES — LAST-MINUTE CHANGES

- (d) Where appropriate, the operating procedures should include means to revise the fuel quantity and define limits to zero fuel weight (ZFW) changes, beyond which a new operational flight plan should be calculated.

#### TRIP FUEL — ARRIVAL ROUTING

##### (e) POINT MERGE PATTERN

When planning for a STAR to point merge, fuel for the direct STAR to the point merge should be included in the trip fuel. The fuel required to account for the probability that part of or the entire point merge route needs to be flown may be included in the contingency fuel unless there is an anticipated delay, in which case, the fuel required for the route should be included in the extra fuel.

##### (f) POINT TROMBONE PATTERN

When planning for a STAR or transition including a trombone pattern, fuel for the reasonably expected route should be included in the trip fuel. The fuel required to account for the probability that an extended part of or the entire trombone pattern route needs to be flown may be included in the contingency fuel unless there is an anticipated delay, in which case, the fuel required for the trombone pattern route should be included in the extra fuel.

#### UNFORESEEN FACTORS

- (g) According to its definition, contingency fuel is the amount of fuel required to compensate for unforeseen factors.

Unforeseen factors are those that could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions, extended unexpected delays in flight, extended unexpected taxi times, and deviations from planned routings and/or cruising levels.

Unforeseen factors may differ based on the type of fuel scheme adopted by each operator; the higher the capability of the operator, the fewer unforeseen factors there may be.

For example, operators that have a fuel consumption monitoring system should calculate the trip fuel based on the individual fuel consumption. Extended unexpected delays or deviations from forecast meteorological conditions are mitigated by means of statistical data.

#### DESTINATION ALTERNATE AERODROME

- (h) The departure aerodrome may be selected as the destination alternate aerodrome.

#### FINAL RESERVE FUEL

- (i) The operator may determine conservative (rounded-up) FRF values for each type and variant of aeroplane that is used in operations. The intent of this recommendation is:

- (1) to provide a reference value for comparing to pre-flight fuel planning computations, and for the purpose of a 'gross error' check; and
- (2) to provide flight crews with easily referenced and recallable FRF figures to support in-flight fuel monitoring and decision-making activities.

#### ANTICIPATED DELAYS

- (j) In the context of fuel schemes, an anticipated delay is defined as one that can be predicted based on the information that is provided by the State of the aerodrome and/or ATS provider before the flight commences. For example, restrictions due to scheduled maintenance work on a runway are likely to cause a delay to the normal flow of inbound traffic. That delay may be promulgated either through NOTAMs or via the aeronautical information publication (AIP), including a specific time and/or date.

Another example is an ATS procedure that requires an operator to fly longer routes, e.g. due to curfew during night-time.

#### DISCRETIONARY FUEL

- (k) Discretionary fuel is defined as 'fuel at the sole discretion of the commander' (PIC). The commander's discretion over the amount of fuel to be carried is independent and cannot be encouraged or discouraged.

#### IN-FLIGHT RE-PLANNING

- (l) In the context of fuel policy, in-flight re-planning means voluntarily changing the destination aerodrome, any alternate aerodrome, or the remainder of the route after the flight commences, even when the flight can be completed as originally planned. In-flight re-planning has a broader sense than being obliged to change the intended course of action due to safety issues (remaining fuel, failures, bad weather conditions, etc.). In-flight re-planning allows the operator to modify the filed flight plan after flight commencement for commercial or other reasons. However, the modified flight plan should fulfil all requirements of a new flight plan. The use of en route alternate (ERA) aerodromes to save fuel should comply with the in-flight re-planning requirements.

In-flight re-planning should not apply when the aircraft no longer continues via the flight plan route to the intended destination for reasons that could not be anticipated. In such cases, the in-flight fuel management policy dictates the commander's course of action.

#### AMC5 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

##### BASIC FUEL SCHEME WITH VARIATIONS — TAXI FUEL

To calculate taxi fuel for a basic fuel scheme with variations, the operator may use statistical taxi fuel.

#### AMC6 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

##### BASIC FUEL SCHEME WITH VARIATIONS — CONTINGENCY FUEL

- (a) Contingency fuel variations are methods of reducing the basic amount of contingency fuel based on established mitigating measures.

- (b) If the operator establishes and maintains a fuel consumption monitoring system for individual aeroplanes, and uses valid data for fuel calculation based on such a system, the operator may use any of the requirements in point (c) or (d) of this AMC to calculate the contingency fuel.
- (c) The contingency fuel should be the fuel described in points (c)(1) or (c)(2) of this AMC, whichever is higher:
- (1) an amount of fuel that should be either:
- (i) not less than 3 % of the planned trip fuel, or in the event of in-flight re-planning, 3 % of the trip fuel for the remainder of the flight provided that a fuel en route alternate (fuel ERA) aerodrome is available; or
  - (ii) an amount of fuel sufficient for 20-minute flying time based upon the planned trip fuel consumption; or
  - (iii) an amount of fuel based on a statistical fuel method that ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel; prior to implementing a statistical fuel method, a continuous 2-year operation is required during which statistical contingency fuel (SCF) data is recorded — note: to use SCF on a particular city pair/aeroplane combination, sufficient data is required to be statistically significant; the operator should use this method to monitor the fuel consumption on each city pair/aeroplane combination, and to carry out a statistical analysis to calculate the required contingency fuel for that city pair/aeroplane combination;
- or
- (2) an amount of fuel to fly for 5 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions.
- (d) RCF procedure: if the operator's fuel policy includes pre-flight planning to a destination 1 aerodrome (commercial destination with an RCF procedure using a decision point along the route) and a destination 2 aerodrome (optional refuelling destination), the amount in the pre-flight calculation of the required usable fuel should be greater than the sum in points (d)(1) or (d)(2):
- (1) the sum of:
- (i) taxi fuel;
  - (ii) trip fuel to the destination 1 aerodrome via the decision point;
  - (iii) contingency fuel equal to not less than 5 % of the fuel that is estimated to be consumed from the decision point to the destination 1 aerodrome;
  - (iv) the amount of fuel specified in AMC2 CAT.OP.MPA.182: destination 1 alternate fuel or no alternate fuel if the remaining flying time from the decision point to destination 1 aerodrome is less than 6 hours;
  - (v) FRF;
  - (vi) additional fuel;
  - (vii) extra fuel if there are anticipated delays or specific operational constraints; and

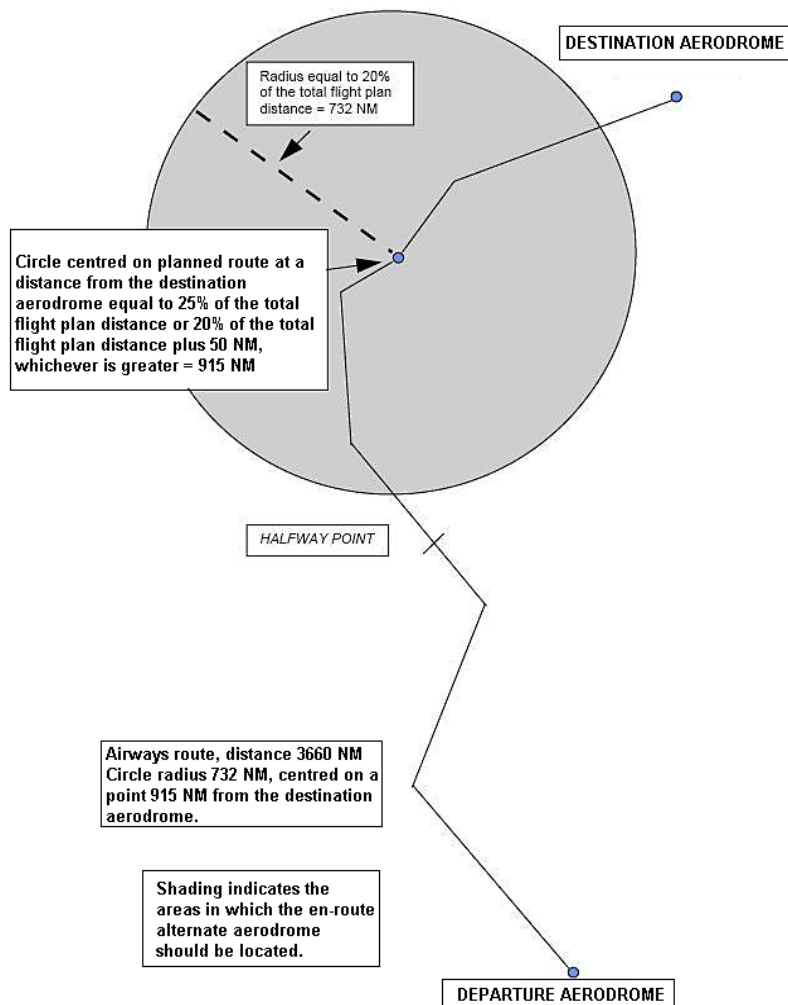
- (viii) discretionary fuel, if required by the commander; or
- (2) the sum of:
  - (i) taxi fuel;
  - (ii) trip fuel to the destination 2 aerodrome via the decision point;
  - (iii) contingency fuel equal to not less than the amount that is calculated in accordance with point (c) of this AMC, from the departure aerodrome to the destination 2 aerodrome;
  - (iv) alternate fuel if a destination 2 alternate aerodrome is required;
  - (v) FRF;
  - (vi) additional fuel;
  - (vii) extra fuel if there are anticipated delays or specific operational constraints; and
  - (viii) discretionary fuel, if required by the commander.

#### AMC7 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

##### **BASIC FUEL SCHEME WITH VARIATIONS — LOCATION OF THE FUEL EN ROUTE ALTERNATE AERODROME TO REDUCE CONTINGENCY FUEL TO 3 %**

The fuel en route alternate (fuel ERA) aerodrome should be located within a circle with a radius equal to 20 % of the total flight plan distance; the centre of this circle lies on the planned route at a distance from the destination aerodrome equal to 25 % of the total flight plan distance, or at least 20 % of the total flight plan distance plus 50 NM, whichever is greater. All distances should be calculated in still-air conditions (see Figure 1). The fuel ERA aerodrome should be nominated in the operational flight plan.

**Figure 1 — Location of the fuel ERA aerodrome to reduce contingency fuel to 3 %**



## GM2 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes

### BASIC FUEL SCHEME WITH VARIATIONS — STATISTICAL CONTINGENCY FUEL METHOD

As an example of statistical contingency fuel, the following statistical values of the deviation from the planned to the actual trip fuel provide appropriate statistical coverage:

(a) 99 % coverage plus 3 % of the trip fuel if the calculated flight time:

- (1) is less than 2 hours; or
- (2) is more than 2 hours and no fuel ERA aerodrome is available;

(b) 99 % coverage if the calculated flight time is more than 2 hours and a fuel ERA aerodrome is available; and

(c) 90 % coverage if:

- (1) the calculated flight time is more than 2 hours;
- (2) a fuel ERA aerodrome is available; and



- (3) at the destination aerodrome, two separate runways are available and usable, one of which is suitable for type B instrument approach operations, and the meteorological conditions are in accordance with point CAT.OP.MPA.182(e).

**AMC8 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes****INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING SYSTEM**

A fuel consumption monitoring system should be data driven, and should include the following:

- (a) a fuel performance monitoring system;
- (b) a database that contains statistically significant data of at least 2 years;
- (c) statistics and data normalisation; and
- (d) data transparency and verification.

**GM3 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes****INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING SYSTEM**

More information can be found in ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual*, Appendix 5 to Chapter 5.

**GM4 CAT.OP.MPA.181 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes****INDIVIDUAL FUEL SCHEME — ANTICIPATED METEOROLOGICAL CONDITIONS**

When determining the extent of the deviation in the area of operation, the operator should monitor the reliability of the meteorological forecast reports. The competent authority should consider restricting or even not allowing a deviation when reliable meteorological information is not available. To this end, tools to predict and improve the reliability of the meteorological forecast reports may be explored to allow for the intended deviation.

**AMC1 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes  
~~Destination aerodromes — instrument approach operations~~****BASIC FUEL SCHEME — TAKE-OFF ALTERNATE AERODROME ~~PBN OPERATIONS~~**

~~The pilot in command should only select an aerodrome as a destination alternate aerodrome if an instrument approach procedure that does not rely on GNSS is available either at that aerodrome or at the destination aerodrome.~~

The take-off alternate aerodrome should not be farther from the departure aerodrome than:

- (a) for two-engined aeroplanes:
  - (1) 1-hour flight time at an one-engine-inoperative (OEI) cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass; or

- (2) the extended-range twin operations (ETOPS) diversion time that is approved in accordance with Subpart F of Annex V (Part-SPA) to Regulation (EU) No 965/2012, subject to any minimum equipment list (MEL) restriction, up to a maximum of 2-hour flight time at OEI cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass; and
- (b) for three- or four-engined aeroplanes, 2-hour flight time at an all-engines-operating cruising speed according to the AFM in ISA and still-air conditions using the actual take-off mass;
- (c) for operations approved in accordance with Annex V (Part-SPA), Subpart L *SINGLE-ENGINE TURBINE AEROPLANE OPERATIONS AT NIGHT OR IN IMC (SET-IMC)*, 30 minutes flying time at normal cruising speed in still-air conditions, based on the actual take-off mass;
- (d) in the case of multi-engined aeroplanes, if the AFM does not contain an OEI cruising speed, the speed to be used for calculation shall be that which is achieved with the remaining engine(s) set at maximum continuous power.

**AMC2 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes****BASIC FUEL SCHEME — DESTINATION ALTERNATE AERODROME**

- (a) For each IFR flight, the operator should select and specify in the operational and ATS flight plans at least one destination alternate aerodrome.
- (b) For each IFR flight, the operator should select and specify in the operational and ATS flight plans two destination alternate aerodromes when for the selected destination aerodrome, the safety margins for meteorological conditions of AMC5 CAT.OP.MPA.182, and the planning minima of AMC6 CAT.OP.MPA.182 cannot be met, or when no meteorological information is available.
- (c) The operator may operate with no destination alternate aerodrome when the destination aerodrome is an isolated aerodrome or when the following two conditions are met:
  - (1) the duration of the planned flight from take-off to landing does not exceed 6 hours or, in the event of in-flight re-planning, in accordance with point CAT.OP.MPA.181(d), the remaining flying time to destination does not exceed 4 hours; and
  - (2) two separate runways are usable at the destination aerodrome and the appropriate weather reports and/or weather forecasts indicate that for the period from 1 hour before to 1 hour after the expected time of arrival, the ceiling is at least 2 000 ft (600 m) or the circling height 500 ft (150 m), whichever is greater, and ground visibility is at least 5 km.

**AMC3 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes**

**BASIC FUEL SCHEME — AERODROME FORECAST METEOROLOGICAL CONDITIONS**

**Table 1 — Aerodrome forecasts (TAFs) and landing forecasts (TRENDS) to be used for pre-flight planning**

APPLICATION OF AERODROME FORECASTS (TAF AND TREND) TO PRE-FLIGHT PLANNING							
<b>(a) APPLICATION OF INITIAL PART OF TAF</b>							
<p><b>(1) Application period:</b> from the start of the TAF validity period to the time of applicability of the first subsequent 'FM...*' or 'BECMG', or if no 'FM...' or 'BECMG' is given, to the end of the validity period of the TAF.</p> <p><b>(2) Application of forecast:</b> the forecast of the prevailing weather conditions in the initial part of the TAF should be fully applied, with the exception of <b>mean wind</b> and <b>gusts</b> that should be applied in accordance with the policy under column 'BECMG AT and FM...' in the table below. However, this may be temporarily superseded by a 'TEMPO' or 'PROB**', if applicable according to the table below.</p>							
<b>(b) APPLICATION OF FORECAST FOLLOWING CHANGE INDICATION IN THE TAF AND TREND</b>							
	FM... (alone) and BECMG AT:	BECMG (alone), BECMG FM, BECMG TL, BECMG FM... TL, in case of:		TEMPO (alone), TEMPO FM, TEMPO FM... TL, PROB 30/40 (alone)		PROB TEMPO	
TAF or TREND for AERODROME PLANNED AS:	Deterioration and improvement	Deterioration	Improvement	Deterioration		Improvement	Deterioration and improvement
				Transient/shower conditions in connection with short-lived weather phenomena, e.g. thunderstorms, showers	Persistent conditions in connection with e.g. haze, mist, fog, dust storm/sandstorm, continuous precipitations	In any case	
DESTINATION at ESTIMATED TIME OF ARRIVAL (ETA) ± 1 HR  TAKE-OFF ALTERNATIVE	Applicable from the start of change  Mean wind should be within	Applicable from the start of change  Mean wind should be within	Applicable from the end of change  Mean wind should be within	Not applicable  Mean wind and gusts exceeding required	Applicable  Mean wind should be within required limits	Should be disregarded	Deterioration may be disregarded. Improvement should be disregarded including mean

at ETA $\pm 1$ HR  <b>DESTINATION ALTERNATIVE</b> at ETA $\pm 1$ HR  <b>FUEL ERA</b> at ETA $\pm 1$ HR	required limits  <b>Gusts</b> exceeding crosswind limits should be fully applied	required limits  <b>Gusts</b> exceeding crosswind limits should be fully applied	required limits  <b>Gusts</b> exceeding crosswind limits should be fully applied	limits may be disregarded	<b>Gusts</b> exceeding crosswind limits should be fully applied	wind and gusts.
<b>ETOPS ERA</b> From earliest ETA to ETA + 1 HR	Applicable from the start of change	Applicable from the start of change	Applicable from the end of change	Applicable if below applicable landing minima	Applicable if below applicable landing minima	
	<b>Mean wind</b> should be within required limits	<b>Mean wind</b> should be within required limits	<b>Mean wind</b> should be within required limits	<b>Mean wind</b> should be within required limits	<b>Mean wind</b> should be within required limits	
	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding limits crosswind should be fully applied	<b>Gusts</b> exceeding limits crosswind should be fully applied	
* The space following 'FM' should always include a time group, e.g. FM1030. Note 1: 'required limits' are those contained in the OM. Note 2: if promulgated aerodrome forecasts do not comply with the provisions of ICAO Annex 3, operators should ensure that guidance on the application of these reports is provided. Note 3: for the definitions of the meteorological terms used in this table, see ICAO Annex 3.						

**AMC4 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes****BASIC FUEL SCHEME — REACHING THE DESTINATION AERODROME**

In the context of the basic fuel scheme and basic fuel scheme with variations, ‘reaching the destination’ means the point at which the aircraft has reached the applicable DA/H or MDA/H at the destination aerodrome.

**AMC5 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes****BASIC FUEL SCHEME — SAFETY MARGINS FOR METEOROLOGICAL CONDITIONS**

(a) The operator should only select an aerodrome as:

- (1) take-off alternate aerodrome; or
- (2) destination aerodrome

when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima as follows:

- (i) RVR or VIS specified in accordance with point CAT.OP.MPA.110; and
- (ii) for a type A or a circling operation, ceiling at or above MDH.

(b) The operator should only select an aerodrome as:

- (1) destination alternate aerodrome;
- (2) fuel ERA aerodrome; or
- (3) isolated destination aerodrome

when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima.

(c) For the take-off alternate aerodrome and isolated destination aerodrome, any limitations related to OEI operations should be taken into account.

**AMC6 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes****BASIC FUEL SCHEME — PLANNING MINIMA**

The operator should select an aerodrome as:

- (a) destination alternate aerodrome;
- (b) fuel ERA aerodrome; or
- (c) isolated destination aerodrome

only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 2 below (any limitations related to OEI operations are also taken into account):

**Table 2 — Basic fuel scheme — planning minima — aeroplanes**  
**Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome**

Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 800 m
Type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m
<b>Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182</b>		
Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).		

## GM1 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes

### BASIC FUEL SCHEME

#### SAFE-LANDING OPTIONS

- (a) Point CAT.OP.MPA.182 sets out the safety objectives of the selection of aerodromes policy. This GM expands on the intent of that provision.

#### ONE SAFE-LANDING OPTION

- (b) Point CAT.OP.MPA.182(a) requires the fuel planning and in-flight re-planning policy to ensure that the aircraft can always proceed to at least one aerodrome where landing is possible, even in abnormal operational conditions. This may require additional fuel (point CAT.OP.MPA.181(c)(6)) to reach an en route alternate (ERA) aerodrome in case of engine or pressurisation failure.

#### ONE OR MORE AERODROMES

- (c) Point CAT.OP.MPA.182(d) requires the operator to select one or more aerodromes at the planning stage; the operator may select only one aerodrome, i.e. the destination aerodrome, in compliance with point CAT.OP.MPA.181(c)(4)(ii).

#### TWO SAFE-LANDING OPTIONS

- (d) Point CAT.OP.MPA.182(d) requires that when planning the flight, two safe-landing options are expected to remain available until the flight reaches its destination, where a decision will be made to commit to land or divert. This will typically be a runway at the destination aerodrome itself and a runway at a destination alternate aerodrome.

The requirement may also be satisfied by two landing runways at the destination aerodrome, provided that the risk of a single event (such as an aircraft accident) or meteorological deterioration at that single aerodrome will not eliminate both options.

- (e) Point CAT.OP.MPA.182(d) may also be satisfied by two destination alternate aerodromes when the destination aerodrome is not a weather-permissible aerodrome or when there is insufficient weather information at the time of planning.
- (f) In the case of an isolated aerodrome, only one safe-landing option exists beyond the point of no return (PNR), therefore, an exception is set out in point CAT.OP.MPA.182(d)(2), where the conditions to proceed beyond the PNR are laid down, and further explained in AMC7 CAT.OP.MPA.182 and in point (b) of AMC2 CAT.OP.MPA.185(a).

**SAFETY MARGINS**

- (f) Point CAT.OP.MPA.182(e) requires operators to apply safety margins to the aerodrome operating minima to mitigate the risk that the destination alternate aerodromes, isolated aerodromes, or fuel ERA aerodromes fall below aerodrome operating minima due to minor unforeseen weather deteriorations.

**AMC7 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes****BASIC FUEL SCHEMES WITH VARIATIONS — ISOLATED AERODROME — POINT OF NO RETURN**

- (a) Unless destination alternate fuel is carried, the operator should use a destination aerodrome as an isolated aerodrome if the alternate fuel plus the FRF that is required to reach the nearest adequate destination alternate aerodrome is more than:
- (1) for aeroplanes with reciprocating engines, the amount of fuel required to fly either for 45 minutes plus 15 % of the flying time planned for cruising, including FRF or for 2 hours, whichever is less; or
  - (2) for turbine-engined aeroplanes, the amount of fuel required to fly for 2 hours with normal cruise consumption above the destination aerodrome, including the FRF.
- (b) If the operator's fuel planning policy includes an isolated aerodrome, a PNR should be determined by a computerised flight-planning system and specified in the operational flight plan. The required usable fuel for pre-flight calculation should be as indicated in points (b)(1) or (b)(2), whichever is greater:
- (1) the sum of:
    - (i) taxi fuel;
    - (ii) trip fuel from the departure aerodrome to the isolated aerodrome via the PNR;
    - (iii) contingency fuel that is calculated in accordance with the operator's current fuel scheme;
    - (iv) additional fuel, if required, but not less than:
      - (A) for aeroplanes with reciprocating engines, the fuel to fly either for 45 minutes plus 15 % of the flight time planned for cruising or for 2 hours, whichever is less; or
      - (B) for turbine-engined aeroplanes, the fuel to fly for 2 hours with normal cruise consumption above the destination aerodrome, including the FRF;
    - (v) extra fuel if there are anticipated delays or specific operational constraints; and
    - (vi) discretionary fuel, if required by the commander; or
  - (2) the sum of:
    - (i) taxi fuel;
    - (ii) trip fuel from the departure aerodrome to the fuel ERA PNR aerodrome via the PNR;
    - (iii) contingency fuel that is calculated in accordance with the operator's current fuel scheme;

- (iv) additional fuel, if required, but not less than:
  - (A) for aeroplanes with reciprocating engines, fuel to fly for 45 minutes; or
  - (B) for turbine-engined aeroplanes, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the fuel ERA aerodrome elevation in standard conditions, which should not be less than the FRF;
- (v) extra fuel if there are anticipated delays or specific operational constraints; and
- (vi) discretionary fuel, if required by the commander.

## AMC8 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes

### BASIC FUEL SCHEME WITH VARIATIONS — PLANNING MINIMA

- (a) Variations to the basic fuel schemes in the selection of aerodromes in regard to the planning minima are methods to reduce the meteorological margins based on the established mitigating measures.
- (b) As a minimum, the operator should:
  - (1) use a suitable computerised flight-planning system; and
  - (2) have established an operational control system that includes flight monitoring.
- (c) In addition:
  - (1) the duration of the planned flight from take-off to landing does not exceed 6 hours or, in the event of in-flight re-planning, in accordance with point CAT.OP.MPA.181(d), the remaining flying time to destination does not exceed 4 hours; and
  - (2) the planned flight should have a minimum flight crew of two pilots.
- (d) Additionally, the operator should select an aerodrome as:
  - (1) a destination alternate aerodrome, or
  - (2) a fuel ERA aerodrome,
 only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 3 below.

**Table 3 — Basic fuel scheme with variations — planning minima — aeroplanes**  
**Destination alternate aerodrome, fuel ERA aerodrome**

Row	Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
1	Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 550 m
2	3D Type A instrument approach operations, based on a facility with a system minimum of 200 ft or less	DA/H or MDA/H* + 200 ft	RVR/VIS** + 800 m
3	Two or more usable type A instrument approach operations***, each based on a separate navigation aid	DA/H or MDA/H* + 200 ft	RVR/VIS** + 1 000 m
4	Other type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m



5	Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m
<b>Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182</b>			
Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).			

\* The higher of the usable DA/H or MDA/H.

\*\* The higher of the usable RVR or VIS.

\*\*\* Compliance with point CAT.OP.MPA.182(f) should be ensured.

Note: The operator may select the most convenient planning minima row. For example, aerodrome with two type A approaches: one ILS CAT I (DA 350 ft/DH250 ft/550 m) another VOR/DME (MDA 650 ft/1 500 m). The operator may use Row 2 instead of Row 3.

## AMC9 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes

### BASIC FUEL SCHEME WITH VARIATIONS — PLANNING MINIMA

(a) Variations to the basic fuel schemes in the selection of aerodromes in regard to the planning minima are methods to reduce the meteorological margins based on the established mitigating measures.

(b) As a minimum, the operator should:

- (1) use a suitable computerised flight-planning system;
- (2) hold an approval for limited-visibility approach operations for that fleet; and
- (3) have established an operational control system that includes flight monitoring.

(c) Additionally, the operator should select an aerodrome as:

- (1) destination alternate aerodrome;
- (2) fuel ERA aerodrome; or
- (3) isolated destination aerodrome

only when the appropriate weather reports and/or forecasts indicate that the weather conditions will be at or above the planning minima of Table 4 below.

**Table 4 — Basic fuel scheme with variations — planning minima**

**Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome**

Row	Type of approach	Aerodrome ceiling (cloud base or vertical VIS)	RVR/VIS
1	Two or more usable type B instrument approach operations to two separate runways***	DA/H* + 100 ft	RVR** + 300 m
2	One usable type B instrument approach operation	DA/H + 150 ft	RVR + 450 m
3	3D Type A instrument approach operations, based on a facility with a system minimum of 200 ft or less	DA/H or MDA/H* + 200 ft	RVR/VIS** + 800 m
4	Two or more usable type A instrument approach operations ***, each based on a separate navigation aid	DA/H or MDA/H* + 200 ft	RVR/VIS** + 1 000 m
5	One usable type A instrument approach operation	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
6	Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m
<b>Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182</b>			

Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).

\* The higher of the usable DA/H or MDA/H.

\*\* The higher of the usable RVR or VIS.

\*\*\* Compliance with point CAT.OP.MPA.182(f) should be ensured.

Note: The operator may select the most convenient planning minima row. For example, aerodrome with two type B approaches: one CAT3 (0 ft/75 m) another CAT1 (200 ft/550 m). The operator may use Row 2 and use CAT3 (0 + 150 ft/75 + 450 m) instead of Row 1 CAT1 (200 + 100 ft/550 + 300 m).

## GM21 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes ~~Destination aerodromes — instrument approach operations~~

### BASIC FUEL SCHEME WITH VARIATIONS — NORMAL CRUISE CONSUMPTION ~~INTENT OF AMC1~~

In the context of AMC7 CAT.OP.MPA.182 on isolated aerodromes, normal cruise consumption is the consumption of fuel for 2 hours above the isolated aerodrome. These two hours include 30-minute FRF, leaving enough fuel for an approximately 90-minute hold over the destination.

More information is provided in ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual* (1st Edition, 2015).

~~(a) The limitation applies only to destination alternate aerodromes for flights when a destination alternate aerodrome is required. A take-off or en-route alternate aerodrome with instrument approach procedures relying on GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures relying solely on GNSS may be used without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met.~~

~~(b) The term 'available' means that the procedure can be used in the planning stage and complies with planning minima requirements.~~

## GM3 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes

### BASIC FUEL SCHEME WITH VARIATIONS — FACILITIES WITH A SYSTEM MINIMUM OF 200 FT OR LESS

(a) Table 3 in AMC8 CAT.OP.MPA.182 and Table 4 in AMC9 CAT.OP.MPA.182 refer to type A instrument approach operations based on a facility with a system minimum of 200 ft or less. Such facilities include ILS/MLS, GBAS landing system (GLS) and GNSS/SBAS (LPV). The system minima for various facilities are contained in AMC3 CAT.OP.MPA.110, Table 3.

(b) In regard to system minima and type of instrument approach operation (type A or B), the following should be noted:

(1) System minimum is the lowest height to which a facility can be used without visual references. This value is not related to a particular runway or obstacle environment.

(2) The type of instrument approach operations is related to each individual runway with its obstacle environment.

(c) Amongst other things the lowest DH for an instrument approach operation is determined by the system minima for the facility and the obstacle clearance height (OCH). The resulting DH determines the type of approach operation (type A or B). If the DH is 250 ft or more, it will be a type A approach operation; if the DH is less than 250 ft, it will be a type B approach operation. So, while ILS approaches to most runways may be conducted as type B approach operations,

difficult obstacle situations, driving up the DH to 250 ft or higher, will result in type A approach operations.

- (d) For example, Row 2 of Table 3 in AMC8 CAT.OP.MPA.182 refers to a case where the obstacle situation and associated OCH result in a DH of 250 ft or more, even though the facility involved supports a DH of 200 ft or less.
- (e) This GM refers only to DH (not MDH) since facilities with a system minimum of 200 ft or less are only operated with a DH (or DA), not an MDH.

#### **GM4 CAT.OP.MPA.182 Fuel/energy scheme — aerodrome selection policy — aeroplanes**

##### **FUEL SCHEMES — PLANNING MINIMA — INSTRUMENT APPROACH OPERATIONS**

An instrument approach operation is considered usable for planning minima (e.g. Tables 2, 3 and 4 in AMC6 CAT.OP.MPA.182, AMC8 CAT.OP.MPA.182 and AMC9 CAT.OP.MPA.182 respectively) when the approach facilities are available, the aircraft is equipped to perform such an approach, the flight crew is accordingly trained, and the runway is available for landing.

#### **GM1 CAT.OP.MPA.182(d)(1) Fuel/energy scheme — aerodrome selection policy — aeroplanes**

##### **INDIVIDUAL FUEL SCHEME — REACHING THE DESTINATION AERODROME**

In the context of individual fuel schemes, ‘reaching the destination’ means being as close as possible to the destination, but not necessarily overhead the destination, and no farther than IAF of the planned instrument approach procedure for the destination aerodrome.

#### **AMC1 CAT.OP.MPA.182(f) Fuel/energy scheme — aerodrome selection policy — aeroplanes**

##### **BASIC FUEL SCHEME — DESTINATION AERODROMES — PBN OPERATIONS**

- (a) To comply with point CAT.OP.MPA.182(f), when the operator intends to use PBN, the operator should select an aerodrome as destination alternate aerodrome only if an instrument approach procedure that does not rely on a GNSS is available either at that aerodrome or at the destination aerodrome.

##### **BASIC FUEL SCHEME — DESTINATION AERODROMES — OPERATIONAL CREDITS**

- (b) To comply with point CAT.OP.MPA.182(f), when the operator intends to use ‘operational credits’ (e.g. EFVS, SA CAT I, etc.), the operator should select an aerodrome as destination alternate aerodrome only if an instrument approach procedure that does not rely on the same ‘operational credit’ is available either at that aerodrome or at the destination aerodrome.

#### **GM1 CAT.OP.MPA.182(f) Fuel/energy scheme — aerodrome selection policy — aeroplanes**

##### **BASIC FUEL SCHEME — DESTINATION AERODROMES — PBN OPERATIONS**

- (a) Point (a) of AMC1 CAT.OP.MPA.182(f) applies only to destination alternate aerodromes in flights that require a destination alternate aerodrome. A take-off or an ERA aerodrome with instrument approach procedures that rely on a GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures that rely solely on a GNSS may be used

without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met.

- (b) The term 'sufficient means are available to navigate to and land at' means that the procedure can be used in the planning stage and should comply with planning minima requirements.

## GM1 CAT.OP.MPA.185 Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes

### BASIC FUEL SCHEME

#### RELEVANT FUEL DATA TO BE RECORDED

- (a) The operator may decide at which regular intervals the relevant fuel data should be recorded.

An example of such intervals could be every 30 minutes for short-range flights and every 60 minutes for longer flights.

- (b) The operator should record at least the following relevant fuel-related data:

- (1) off-block fuel;
- (2) take-off fuel if this data can be recorded automatically;
- (3) 'MINIMUM FUEL' declarations;
- (4) 'MAYDAY MAYDAY MAYDAY FUEL' declarations;
- (5) fuel after touchdown if this data can be recorded automatically; and
- (6) on-block fuel.

When an aircraft communications addressing and reporting system (ACARS) is available, the operator does not need to record this data.

#### RELIABLE SOURCE TO OBTAIN DELAY INFORMATION

- (c) A reliable source to obtain delay information may be derived from data provided by an air navigation services provider (ANSP) and should have the following characteristics ranked in order of priority:

- (1) integrity: provide timely warnings to users when the delay information should not be used;
- (2) availability: the time during which the delay information is accessible to the crew;
- (3) accuracy: the degree of conformity between the estimated delay and the true delay; the delay information should be communicated with its corresponding gap error, e.g. delay of  $15 \pm 2$  minutes; the gap error should be added to the base value; and
- (4) continuity: the capability of the service to provide the delay information without unscheduled interruptions during the intended operation.

#### 'MINIMUM FUEL' DECLARATION

- (d) The 'MINIMUM FUEL' declaration informs the ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing. It also informs the ATC that any change to the existing clearance may result in landing with less than the planned FRF. This is not

an emergency situation but an indication that an emergency situation is possible, should any additional delay occur.

- (e) When committed to land at a specific aerodrome, the commander should take into account any operational factor that may cause a delay to landing, and thus determine whether the aircraft will land with less than the planned FRF, even after receiving clearance from ATC. A change that may cause a delay to landing could be other than the ATC, e.g. a change of weather conditions, etc. If any such factor is likely to result in landing with less than the planned FRF, the commander should declare 'MINIMUM FUEL' to ATC.
- (f) The pilot should not expect any form of priority handling as a result of a 'MINIMUM FUEL' declaration. However, the ATC should advise the flight crew of any additional expected delays, as well as coordinate with other ATC units when transferring the control of the aeroplane, to ensure that the other ATC units are aware of the flight's fuel state.
- (g) **Example 1:** The aircraft is on the final approach to the destination aerodrome with a single runway, with just the destination alternate fuel plus FRF available. The aircraft ahead has a tyre burst upon landing and has stopped on the runway. The ATC orders the aircraft on final approach to execute a go-around as the destination aerodrome is closed due to a blocked runway. After completing the go-around, the flight crew decides to divert to the destination alternate aerodrome. After the ATC gives clearance for the destination alternate aerodrome and if the calculated fuel upon landing is close to the FRF, the flight crew should declare 'MINIMUM FUEL'. The flight crew has now committed to land at the destination alternate aerodrome, and any change to the clearance may result in landing there with less than the planned FRF.
- (h) **Example 2:** The aircraft is approaching the clearance limit point, which has a holding pattern operating at this point in time. The ATC gives the aircraft an expected arrival time that would result in a delay of 25 minutes, and the aircraft enters the holding zone. On receiving this information and prior to entering the holding pattern, the remaining fuel is 7-minute contingency fuel plus 25-minute destination alternate fuel plus 30-minute FRF. The weather conditions and aircraft serviceability are such that the flight crew can convert the destination alternate fuel into holding time over the destination aerodrome. When the remaining fuel no longer allows a diversion from the holding pattern, then the flight crew should declare 'MINIMUM FUEL'. The flight crew has committed to land at the destination aerodrome, and any change to the clearance may result in landing with less than the planned FRF.
- (i) **Example 3:** The aircraft reaches FL 350, which is the cruising flight level on its 5-hour flight. The weather forecast information that was obtained before departure was favourable and, therefore, the commander did not order any discretionary fuel. The destination alternate fuel is sufficient for 25-minute flight time and the destination alternate aerodrome is located beyond the destination aerodrome. For some reason (unexpected severe turbulence, cockpit window crack, etc.), the aircraft has to descend and continue the flight at FL 230, where fuel consumption is higher. In-flight fuel checks and fuel management now show that the destination aerodrome can still be reached but only if in-flight re-planning is done without the destination alternate aerodrome (the destination aerodrome has two runways and good weather, and it is less than 6-hour flight time away, thus meeting the conditions for not requiring an alternate aerodrome). By doing so, the aircraft will arrive at destination for a straight-in approach with exactly the FRF plus 15-minute flight time. During the next 3,5 hours, an ERA aerodrome is available, and the situation is under control. When approaching the destination, the aircraft has

to commit to land at the destination aerodrome as there is no other destination alternate aerodrome within 15 minutes of reaching the destination aerodrome. The ATC now informs the pilots that there is a change of landing runway resulting in a 12-minute trip fuel increase. It is time to declare 'MINIMUM FUEL'.

- (j) Several scenarios illustrating circumstances that could lead to a 'MINIMUM FUEL' declaration are provided in ICAO Doc 9976 *Flight Planning and Fuel Management (FPFM) Manual* (1st Edition, 2015) and the *EASA Fuel Manual*.

#### ENSURING A SAFE LANDING — FINAL RESERVE FUEL PROTECTION

- (k) The objective of the FRF protection is to ensure that a safe landing is made at any aerodrome when unforeseen circumstances may not allow to safely complete the flight, as originally planned.

The commander should always consider first planning a safe-landing option and estimating whether this landing can be performed with more than the FRF. When this estimation indicates that the FRF can no longer be protected, then a fuel emergency should be declared and any landing option explored (e.g. aerodromes not assessed by operators, military aerodromes, closed runways), including deviating from rules, operational procedures, and methods in the interest of safety (as per point CAT.GEN.MPA.105(b)). ICAO Doc 9976 and the *EASA Fuel Manual* provide further detailed guidance on the development of a comprehensive in-flight fuel management policy and related procedures.

Note: See Annex I (Definitions) to Regulation (EU) No 965/2012 for the definition of 'safe landing'.

#### FURTHER GUIDANCE ON PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT

- (l) ICAO Doc 9976 and the *EASA Fuel Manual* provide guidance on procedures for in-flight fuel management including reanalysis, adjustment, and/or re-planning considerations when a flight begins to consume contingency fuel before take-off.

### AMC1 CAT.OP.MPA.185(a) Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes

#### BASIC FUEL SCHEME — PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT

- (a) In-flight fuel checks
- (1) The operator should establish a procedure to ensure that in-flight fuel checks are carried out at regular intervals or at specified points indicated in the operational flight plan (one check at least every 60 minutes).
  - (2) The remaining usable fuel should be evaluated to:
    - (i) compare the actual consumption with the planned consumption;
    - (ii) check that the remaining usable fuel is sufficient to complete the flight, in accordance with point (b); and
    - (iii) determine the usable fuel that is expected to remain upon landing at the destination aerodrome.
  - (3) In relation to the recording of relevant data, the operator should:

- (i) agree with the competent authority on what constitutes relevant data for the purpose of recoding;
- (ii) use the relevant data as safety performance indicators (SPIs) of the current fuel scheme; and
- (iii) ensure that the recorded data is stored for at least 2 years.

The operator should establish a procedure for the data to be de-identified to a level that ensures the implementation of a 'just culture'.

**(b) In-flight fuel management**

- (1) The flight should be conducted to ensure that the usable fuel expected to remain upon landing at the destination aerodrome is not less than:
  - (i) the required alternate fuel plus the FRF; or
  - (ii) the FRF if no alternate aerodrome is required.
- (2) If an in-flight fuel check shows that the usable fuel expected to remain upon landing at the destination aerodrome is less than:
  - (i) the required alternate fuel plus the FRF, the commander should request delay information from the ATC, and take into account the prevailing traffic and operational conditions at the destination aerodrome, at the destination alternate aerodrome, and at any other adequate aerodrome, to decide whether to proceed to the destination aerodrome or to divert in order to perform a safe landing with not less than the FRF; or
  - (ii) the FRF, if no destination alternate aerodrome is required, the commander should take appropriate action and proceed to an aerodrome where a safe landing can be made with not less than the FRF.

(c) The use of fuel after flight commencement for objectives other than the ones originally intended during pre-flight planning should require reanalysis and, if applicable, adjustment of the planned operation.

**AMC2 CAT.OP.MPA.185(a) Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes**

**BASIC FUEL SCHEME WITH VARIATIONS — PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT**

- (a) In addition to AMC1 CAT.OP.MPA.185(a) and in the context of point (d) of AMC6 CAT.OP.MPA.181, if the RCF procedure is used on a flight to proceed to destination 1 aerodrome, the commander should ensure that the remaining usable fuel at the decision point is at least the total of the following:
- (1) trip fuel from the decision point to destination 1 aerodrome;
  - (2) contingency fuel that is equal to 5 % of the trip fuel from the decision point to destination 1 aerodrome;
  - (3) destination 1 aerodrome alternate fuel if a destination 1 alternate aerodrome is required;
  - (4) additional fuel, if required; and

(5) FRF.

(b) In addition to AMC1 CAT.OP.MPA.185(a), on a flight to an isolated aerodrome, the commander should ensure that the remaining usable fuel at the actual PNR is at least the total of the following:

(1) trip fuel from the PNR to the destination isolated aerodrome;

(2) contingency fuel from the PNR to the destination isolated aerodrome; and

(3) the additional fuel required for isolated aerodromes, as described in AMC7 CAT.OP.MPA.182.

### AMC3 CAT.OP.MPA.185(a) Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes

#### INDIVIDUAL FUEL SCHEME — COMMITTING TO LAND AT A SPECIFIC AERODROME

The operator should provide relevant safety information to the commander before the commander decides to commit to land at a specific aerodrome.



**GM2-CAT.OP.MPA.185 Planning minima for IFR flights — aeroplanes**

**AERODROME WEATHER FORECASTS**

**APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)**

**1. APPLICATION OF INITIAL PART OF TAF**

- a) **Application time period:** From the start of the TAF validity period up to the time of applicability of the first subsequent ‘FM...\*’ or ‘BECMG’, or if no ‘FM’ or ‘BECMG’ is given, up to the end of the validity period of the TAF.
- b) **Application of forecast:** The prevailing weather conditions forecast in the initial part of the TAF should be fully applied with the exception of the mean wind and gusts (and crosswind) which should be applied in accordance with the policy in the column ‘BECMG AT and FM’ in the table below. This may however be overdue temporarily by a ‘TEMPO’ or ‘PROB\*\*’ if applicable according to the table below.

**2. APPLICATION OF FORECAST FOLLOWING CHANGE INDICATION IN TAF AND TREND**

TAF or TREND for AERODROME PLANNED AS:	FM (alone) and BECMG AT:			BECMG (alone), BECMG FM, BECMG TL, BECMG FM...*TL, in case of:		TEMPO (alone), TEMPO FM, TEMPO FM...TL, PROB30/40 (alone)		PROB TEMPO
	Deterioration and Improvement	Deterioration	Improvement	Deterioration		Improvement	Deterioration and Improvement	
<b>DESTINATION</b> at ETA ± 1 HR	Applicable from the <b>start of the change</b>	Applicable from the <b>time of the start of the change</b>	Applicable from the <b>time of the end of the change</b>	Not applicable		Applicable	Should be disregarded	Deterioration may be disregarded.
<b>TAKE OFF</b> ALTERNATE at ETA ± 1 HR	<b>Mean wind:</b> Should be within required limits	<b>Mean wind:</b> Should be within required limits	<b>Mean wind:</b> Should be within required limits	<b>Mean wind and gusts</b> exceeding required limits may be disregarded		<b>Mean wind:</b> Should be within required limits	In any case	Improvement should be disregarded including mean wind and gusts.
<b>DEST. ALTERNATE</b> at ETA ± 1 HR	<b>Gusts:</b> May be disregarded	<b>Gusts:</b> May be disregarded	<b>Gusts:</b> May be disregarded			<b>Gusts:</b> May be disregarded		
<b>EN-ROUTE</b> ALTERNATE at ETA ± 1 HR								

<b>ETOPS — ENRT</b> <b>ALTN</b> at earliest/latest ETA ± 1 HR	Applicable from the <b>time of start</b> of change	Applicable from the <b>time of start</b> of change	Applicable from the <b>time of end</b> of change	Applicable if below applicable landing minima	Applicable if below applicable landing minima		
	<b>Mean wind:</b> should be within required limits	<b>Mean wind:</b> should be within required limits	<b>Mean wind:</b> should be within required limits	<b>Mean wind:</b> Should be within required limits	<b>Mean wind:</b> Should be within required limits		
	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied	<b>Gusts</b> exceeding crosswind limits should be fully applied		

Note 1: 'Required limits' are those contained in the Operations Manual.

Note 2: If promulgated aerodrome forecasts do not comply with the requirements of ICAO Annex 3, operators should ensure that guidance in the application of these reports is provided.

\* The space following 'FM' should always include a time group e.g. 'FM1030'.

**GM1 CAT.OP.MPA.186 Planning minima for IFR flights — helicopters****PLANNING MINIMA FOR ALTERNATE AERODROMES**

Non-precision minima (NPA) in Table 1 of CAT.OP.MPA.186 mean the next highest minima that apply in the prevailing wind and serviceability conditions. Localiser only approaches, if published, are considered to be non-precision in this context. It is recommended that operators wishing to publish tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Unserviceabilities should, however, be fully taken into account.

As Table 1 does not include planning minima requirements for APV, LTS CAT I and OTS CAT II operations, the operator may use the following minima:

- (a) for APV operations — NPA or CAT I minima, depending on the DH/MDH;
- (b) for LTS CAT I operations — CAT I minima; and
- (c) for OTS CAT II operations — CAT II minima.

**AMC1 CAT.OP.MPA.190 Submission of the ATS flight plan****FLIGHTS WITHOUT ATS FLIGHT PLAN**

- (a) When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, the operator should establish procedures, instructions and a list of nominated persons to be responsible for alerting search and rescue services.
- (b) To ensure that each flight is located at all times, these instructions should:
  - (1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date and estimated time for re-establishing communications;
  - (2) if an aircraft is overdue or missing, provide for notification to the appropriate ATS or search and rescue facility; and
  - (3) provide that the information will be retained at a designated place until the completion of the flight.

**AMC1 CAT.OP.MPA.191(b)&(c) Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — helicopters****PLANNING CRITERIA**

- (a) The pre-flight calculation of the required usable fuel to be carried on board should include the following:
  - (1) taxi fuel, which should take into account local conditions at the departure site and the APU consumption;
  - (2) trip fuel, which should include fuel:
    - (i) for take-off and climb from the departure site elevation to the initial cruising level/altitude, taking into account the expected departure routing;

- (ii) from the top of climb to the top of descent, including any step climb/descent;
  - (iii) from the top of descent to the point where the approach procedure is initiated, taking into account the expected arrival procedure; and
  - (iv) for the approach and landing at the destination site;
- (3) contingency fuel, which should be:
- (i) for IFR flights, or for VFR flights in a hostile environment, 10 % of the planned trip fuel; or
  - (ii) for VFR flights in a non-hostile environment, 5 % of the planned trip fuel;
- (4) alternate fuel, which should be:
- (i) fuel for a missed approach from the applicable DA/H or MDA/H at the destination to the missed-approach altitude, taking into account the complete missed-approach procedure;
  - (ii) fuel for climb from the missed approach altitude to the cruising level/altitude;
  - (iii) fuel for the cruise from the top of climb to the top of descent;
  - (iv) fuel for descent from the top of descent to the point where the approach is initiated, taking into account the expected arrival procedure;
  - (v) fuel for the approach and landing at the destination alternate that is selected in accordance with point CAT.OP.MPA.192; and
  - (vi) for helicopters operating to or from helidecks that are located in a hostile environment, 10 % of points (a)(4)(i) to (a)(4)(v);
- (5) FRF;
- (6) extra fuel if there are anticipated delays or specific operational constraints; and
- (7) discretionary fuel, which should be at the sole discretion of the commander.
- (b) Reduced contingency fuel (RCF) IFR procedure
- If the operator's fuel scheme includes pre-flight planning to a destination 1 aerodrome (commercial destination) with an RCF procedure using a decision point along the route and a destination 2 aerodrome (optional refuelling destination), the pre-flight calculation of the required usable fuel should be according to points (b)(1) or (b)(2), whichever is greater:
- (1) the sum of:
    - (i) taxi fuel;
    - (ii) trip fuel to the destination 1 aerodrome via the decision point;
    - (iii) contingency fuel equal to not less than 10 % of the estimated fuel consumption from the decision point to the destination 1 aerodrome;
    - (iv) alternate fuel;
    - (v) FRF;
    - (vi) extra fuel if there are anticipated delays or specific operational constraints; and

- (vii) discretionary fuel, which should be at the sole discretion of the commander; or
- (2) the sum of:
- (i) taxi fuel;
  - (ii) trip fuel to the destination 2 aerodrome via the decision point;
  - (iii) contingency fuel equal to not less than 10 % of the estimated fuel consumption from the decision point to the destination 2 aerodrome;
  - (iv) alternate fuel, if a destination 2 alternate aerodrome is required;
  - (v) FRF;
  - (vi) extra fuel if there are anticipated delays or specific operational constraints; and
  - (vii) discretionary fuel, which should be at the sole discretion of the commander.
- (c) Isolated aerodrome IFR procedure
- If the operator's fuel policy includes planning to fly to an isolated aerodrome under IFR or under VFR over routes not navigated by reference to visual landmarks, for which a destination alternate does not exist, the pre-flight calculation of the required usable fuel should include:
- (1) taxi fuel;
  - (2) trip fuel;
  - (3) contingency fuel calculated in accordance with point (a)(3);
  - (4) additional fuel to fly for 2 hours at holding speed, including FRF; and
  - (5) extra fuel if there are anticipated delays or specific operational constraints; and
  - (6) discretionary fuel, which should be at the sole discretion of the commander.
- (d) Sufficient fuel should be carried at all times to ensure that following the failure of an engine that occurs at the most critical point along the route, the helicopter is able to:
- (1) descend as necessary and proceed to an adequate aerodrome;
  - (2) hold for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and
  - (3) make an approach and land.

#### **AMC1 CAT.OP.MPA.192 Selection of aerodromes and operating sites — helicopters**

##### **PLANNING MINIMA AND SAFETY MARGINS FOR A DESTINATION AERODROME AND SELECTION OF ALTERNATE AERODROMES**

- (a) When selecting the destination aerodrome, the operator should ensure that one of the following conditions is met:
- (1) for a land destination, the duration of the flight and the prevailing meteorological conditions are such that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome or operating site, an approach and landing is possible under VMC from the minimum safe altitude at the IAF or before;

- (2) for a land destination:
- (i) the available current meteorological information indicates that the following meteorological conditions at the destination aerodrome will exist from 2 hours before to 2 hours after the estimated time of arrival, or from the actual time of departure to 2 hours after the estimated time of arrival, whichever is shorter:
    - (A) a ceiling of at least 120 m (400 ft) above the DA/H or MDA/H of the instrument approach procedure; and
    - (B) visibility of at least 3 000 m;
  - (ii) a runway and two published instrument approaches with independent navigation aids are available at the aerodrome of intended landing; and
  - (iii) fuel planning is based upon the approach procedure that requires the most fuel, and 15-minute fuel is added to the trip fuel;
- (3) one destination alternate aerodrome is selected, and the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the destination, the weather conditions at the destination will be at or above the applicable planning minima as follows:
- (i) RVR or VIS specified in accordance with point CAT.OP.MPA.110; and
  - (ii) for type A instrument approach operations, ceiling at or above (M)DH;
- (4) one destination alternate aerodrome is selected, and based on the meteorological information that is obtained in accordance with the procedures of the operations manual (OM), there is a reasonable probability of landing at the destination;
- (5) two destination alternate aerodromes are selected; or
- (6) the destination aerodrome is isolated, and the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the destination, the weather conditions at the destination will be at or above the applicable planning minima defined in Table 1.
- (b) The operator should specify any alternate aerodrome(s) in the operational flight plan.
- (c) If the site of intended landing is isolated and no alternate aerodrome is available, a PNR should be determined.

#### **PLANNING MINIMA FOR DESTINATION ALTERNATE AERODROMES AND ISOLATED AERODROMES**

- (d) The operator should select the destination alternate aerodrome(s) only if the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome or operating site, the weather conditions will be at or above the applicable planning minima as follows:
- (1) if the destination aerodrome is selected by meeting the conditions in points (a)(3) or (a)(5), the planning minima for the destination alternate aerodrome(s) and an isolated aerodrome are as shown in Table 1:

**Table 1 — Planning minima for a destination alternate aerodrome and an isolated aerodrome**

Type of approach	Planning minima
Type A or type B	RVR/VIS + 400 m Ceiling at or above (M)DH + 200 ft
VFR or visual approach	VFR from a position on the instrument flight path to the destination alternate aerodrome

or

(2) if the destination aerodrome is selected by meeting the condition in point (a)(4), the planning minima for the destination alternate aerodrome(s) are as shown in Table 2:

**Table 2 — Planning minima for a destination alternate aerodrome with a reasonable probability of landing at the destination**

Type of approach	Planning minima
Type A or type B	RVR/VIS + 800 m (M)DH + 400 ft
VFR or visual approach	VFR from a position on the instrument flight path to the destination alternate aerodrome

### DETERMINATION OF THE METEOROLOGICAL CONDITIONS FOR A SAFE LANDING AT THE DESTINATION

(e) To assess the probability of landing at the destination, when flying under IFR to heliports/operating sites without the meteorological information from a certified service provider, the operator should use supplemental meteorological information, or the operator should select two destination alternates. Such meteorological information is usually available at aerodromes. In Europe, the certification of service providers is based on Annex V (Part-MET) to Regulation (EU) 2017/373. In addition, all the following conditions should be met:

- (1) The operator should establish a system for observing and assessing the weather, as well as for distributing meteorological information.
- (2) The operator should describe in the OM the system defined in point (1).
- (3) The operator should assess the weather at the destination aerodrome, and if different, also at the location of the instrument approach. The assessment should be based on the following:
  - (i) an appropriate weather forecast at an aerodrome where it is reasonable to expect that the local conditions are not significantly different from the conditions at the destination and the location of the instrument approach;
  - (ii) if the aerodrome described in point (e)(3)(i) is farther than 15 NM away from the location of the approach and the destination, the following conditions should be met:
    - (A) supplemental meteorological information should be available and confirm that the current weather conditions at destination and at the location of the

- instrument approach are expected to remain similar to the conditions at the aerodrome described in point (e)(3)(i); and
- (B) low-level area forecasts should confirm that the weather is expected to remain similar at destination and at the aerodrome used for the weather assessment, at the expected time of landing; and
- (iii) any risk of adverse local weather condition forecast in the low-level area forecasts and relevant to the destination and the location of the instrument approach.
- (4) The following should qualify as supplemental meteorological information:
- (i) a reliable, timestamped image from a serviceable digital camera of known location, bearing, and altitude, which shows the weather conditions in the approach path at destination;
- (ii) a meteorological observation from a properly trained observer; and
- (iii) a report from non-certified automatic weather observation systems to which the operator should apply relevant margins based on the reliability and precision of the system.
- (5) The operator should establish that there is a reasonable probability of landing at the destination only if the flight time to the destination and then to the alternate aerodrome is less than 3 hours, and if according to the assessment described in point (e)(3), during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the location of the approach, the following conditions are met:
- (i) the weather conditions will be at or above the planning minima for the approach; and
- (ii) if the location of the approach is different from that of the destination aerodrome, the weather conditions will allow to continue the flight to the destination.
- (6) Weather observations from the aerodrome described in point (e)(3)(i), or the supplemental meteorological information that is described in point (e)(4), should be available, be no more than 30 minutes old, and be used to assess approach and landing conditions in accordance with point CAT.OP.MPA.300.
- (7) The weather observations or information that are described in point (e)(6) may be transmitted to the flight crew using installed equipment, a T-PED, radio communication with trained personnel, or any equivalent means.
- (8) The operator should store the weather assessments established in point (e)(3) and the weather observations referred to in point (e)(6) for a period of 3 months.
- (9) In case a landing at the destination is not possible due to the weather, even though it was assessed that it would be, the operator should investigate and take all necessary measures to improve future weather assessments.



**AMC1 CAT.OP.MPA.192(a) Selection of aerodromes and operating sites — helicopters****PLANNING MINIMA FOR TAKE-OFF ALTERNATE AERODROMES**

The operator should select an aerodrome or landing site as a take-off alternate aerodrome or landing site only when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the take-off alternate aerodrome or landing site, the weather conditions will be at or above the applicable landing minima specified in accordance with point CAT.OP.MPA.110. The ceiling should be taken into account when the only available approach operations are type A. Any limitations related to OEI operations should be also taken into account.

**GM1 CAT.OP.MPA.192(c)&(d) Selection of aerodromes and operating sites — helicopters****METEOROLOGICAL INFORMATION**

(a) Meteorological data conforms to ICAO Annex 3 and to Annex V (Part-MET) to Regulation (EU) 2017/373. As the following meteorological data is point specific, caution should be exercised when associating it with nearby aerodromes (or helidecks).

(b) METARs

(1) Routine and special meteorological observations at offshore installations should be made during periods and at a frequency agreed between the competent authority of the meteorological services provider and the operator concerned. They should conform to points MET.TR.200 and MET.TR.205 of Part-MET, including the desirable accuracy of observations, which is specified in GM2 MET.TR.210.

(2) Routine and selected special reports are exchanged between meteorological offices in the METAR (aerodrome routine meteorological report) or SPECI (aerodrome special meteorological report) code forms that are prescribed by the World Meteorological Organization.

(c) Aerodrome forecasts (TAFs)

(1) The aerodrome forecast consists of a concise statement of the expected meteorological conditions at an aerodrome and any significant changes expected to occur during a specified period of validity, which is usually not less than 9 hours, and not more than 30 hours. The forecast includes surface wind, visibility, weather and cloud, and expected changes of one or more of these elements during the period. Additional elements may be included as agreed between the meteorological authority and the operators concerned. Where these forecasts relate to offshore installations, barometric pressure and temperature should be included to facilitate the planning of helicopter landing and take-off performance.

(2) Aerodrome forecasts are most commonly exchanged in the TAF code form, and the detailed description of an aerodrome forecast is promulgated in point MET.TR.220 of Part-MET, together with the operationally desirable accuracy elements that are specified in GM3 MET.TR.220.

**(d) Landing forecasts (TRENDS)**

- (1) The landing forecast consists of a concise statement that indicates any significant changes expected to occur at an aerodrome during the 2-hour period immediately following the time of the observation to which it is appended. It contains one or more of the following meteorological elements: surface wind, visibility, weather phenomena, clouds, and other significant information, such as barometric pressure and temperature, as may be agreed between the meteorological authority and the operators concerned.
- (2) The detailed description of the landing forecast is promulgated in point MET.TR.225 of Part-MET, together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within  $\pm 30\%$  of the forecast values in 90 % of the cases.
- (3) Landing forecasts most commonly take the form of a TREND forecast appended to a local routine report, local special report, METAR, or SPECI.

**GM2 CAT.OP.MPA.192(c)&(d) Selection of aerodromes and operating sites — helicopters****SUPPLEMENTAL METEOROLOGICAL INFORMATION USING DIGITAL IMAGERY**

- (a) One or more digital images from a digital camera may be considered as supplemental meteorological information if the following criteria are met:
  - (1) the camera has a known altitude, azimuth, elevation, and field of view; if pan, tilt or zoom functions are available, the image includes the elevation, azimuth, and an indication of how much the image is zoomed;
  - (2) the camera is robustly fixed to a solid surface and protected from deliberate or accidental interference; it is secured from the effects of wind and precipitation;
  - (3) the digital image contains date and timestamp information or other means to ensure that the image is up to date; and
  - (4) the digital image has a clearly specified update frequency.
- (b) If the operator uses the digital image to assess ceiling and visibility, the operator should document the height, bearing, and distance of clearly distinguishable features, and provide a reference image taken on a clear day with negligible cloud or mist.
- (c) The operator may achieve the purpose of point (b) with a selectable reference image or a selectable data layer to be superposed on the image. Any selectable reference image should clearly indicate that it is a reference image, and not a current image.
- (d) If the operator uses night-time digital images, the quality of those images should remain sufficient to be compared to the reference image, and the darkness should not obscure the distinguishable features described in point (b). This may be achieved by adapting the camera to the current luminosity.
- (e) If the digital image is stamped with the value of one or more weather parameters, there should be a means to ensure that each parameter is up to date and provided by a reliable and functional sensor; otherwise, that parameter should not be displayed.

- (f) If the camera is exposed to local meteorological conditions such as the foehn effect, the operator should document these local conditions, or the supplemental meteorological information should only be valid in the immediate vicinity of the camera.

**AMC1 CAT.OP.MPA.192(d) Selection of aerodromes and operating sites — helicopters****DESTINATION AND DESTINATION ALTERNATE AERODROMES — PBN OPERATIONS**

To comply with CAT.OP.MPA.192(d), when the operator intends to use PBN, the operator should select an aerodrome as a destination alternate aerodrome only if an instrument approach procedure that does not rely on a GNSS is available either at that aerodrome or at the destination aerodrome.

**GM1 CAT.OP.MPA.192(d) Selection of aerodromes and operating sites — helicopters****DESTINATION AND DESTINATION ALTERNATE AERODROMES — PBN OPERATIONS**

- (a) AMC1 CAT.OP.MPA.192(d) applies only to destination alternate aerodromes in flights that require a destination alternate aerodrome. A take-off or ERA aerodrome with instrument approach procedures that rely on a GNSS may be planned without restrictions. A destination aerodrome with all instrument approach procedures that rely solely on a GNSS may be used without a destination alternate aerodrome if the conditions for a flight without a destination alternate aerodrome are met.
- (b) The term ‘available’ means that the procedure can be used in the planning stage and should comply with planning minima requirements.

**~~AMC1 CAT.OP.MPA.195 Refuelling/defuelling with passengers embarking, on board or disembarking~~****~~OPERATIONAL PROCEDURES — GENERAL~~**

- ~~(a) When refuelling/defuelling with passengers on board, ground servicing activities and work inside the aircraft, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and allow emergency evacuation to take place through those aisles and exits intended for emergency evacuation.~~
- ~~(b) The deployment of integral aircraft stairs or the opening of emergency exits as a prerequisite to refuelling is not necessarily required.~~

**~~OPERATIONAL PROCEDURES — AEROPLANES~~**

- ~~(c) Operational procedures should specify that at least the following precautions are taken:~~
- ~~(1) one qualified person should remain at a specified location during fuelling operations with passengers on board. This qualified person should be capable of handling emergency procedures concerning fire protection and firefighting, handling communications, and initiating and directing an evacuation;~~
  - ~~(2) two-way communication should be established and should remain available by the aeroplane's inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane; the involved personnel should remain within easy reach of the system of communication;~~

- ~~(3) — crew, personnel and passengers should be warned that re/defuelling will take place;~~
- ~~(4) — ‘Fasten Seat Belts’ signs should be off;~~
- ~~(5) — ‘NO SMOKING’ signs should be on, together with interior lighting to enable emergency exits to be identified;~~
- ~~(6) — passengers should be instructed to unfasten their seat belts and refrain from smoking;~~
- ~~(7) — the minimum required number of cabin crew should be on board and be prepared for an immediate emergency evacuation;~~
- ~~(8) — if the presence of fuel vapour is detected inside the aeroplane, or any other hazard arises during re/defuelling, fuelling should be stopped immediately;~~
- ~~(9) — the ground area beneath the exits intended for emergency evacuation and slide deployment areas should be kept clear at doors where stairs are not in position for use in the event of evacuation; and~~
- ~~(10) — provision is made for a safe and rapid evacuation.~~

#### **OPERATIONAL PROCEDURES — HELICOPTERS**

- ~~(d) — Operational procedures should specify that at least the following precautions are taken:
  - ~~(1) — door(s) on the refuelling side of the helicopter remain closed;~~
  - ~~(2) — door(s) on the non-refuelling side of the helicopter remain open, weather permitting;~~
  - ~~(3) — firefighting facilities of the appropriate scale be positioned so as to be immediately available in the event of a fire;~~
  - ~~(4) — sufficient personnel be immediately available to move passengers clear of the helicopter in the event of a fire;~~
  - ~~(5) — sufficient qualified personnel be on board and be prepared for an immediate emergency evacuation;~~
  - ~~(6) — if the presence of fuel vapour is detected inside the helicopter, or any other hazard arises during refuelling/defuelling, fuelling be stopped immediately;~~
  - ~~(7) — the ground area beneath the exits intended for emergency evacuation be kept clear; and~~
  - ~~(8) — provision is made for a safe and rapid evacuation.~~~~

#### **AMC1 CAT.OP.MPA.195 Fuel/energy scheme — in-flight fuel/energy management policy — helicopters**

#### **ENSURING A SAFE LANDING FOR COMPLEX MOTOR-POWERED HELICOPTERS IN OTHER THAN LOCAL OPERATIONS**

The operator should base in-flight fuel management procedures on the following criteria:

- (a) in-flight fuel checks:**
  - (1) the commander should establish a procedure to ensure that in-flight fuel checks are carried out at regular intervals; the remaining usable fuel should be recorded and evaluated to:**

- (i) compare the actual consumption with the planned consumption;
  - (ii) check that the remaining usable fuel is sufficient to complete the flight; and
  - (iii) determine the usable fuel that is expected to remain upon landing at the destination; and
- (2) the relevant fuel data should be recorded;
- (b) in-flight fuel management:
  - (1) if an in-flight fuel check shows that the usable fuel that is expected to remain upon landing at the destination is less than the required alternate fuel plus the FRF, the commander should:
    - (i) divert; or
    - (ii) replan the flight in accordance with point SPA.HOFO.120(b)(1) unless the commander considers it safer to proceed to the destination; and
  - (2) at an onshore destination, when two suitable, separate touchdown and lift-off areas are available at the destination, and the expected weather conditions at the destination are as specified for planning in point CAT.OP.MPA.245(a)(2), the commander may permit alternate fuel to be used before landing at the destination; and
- (c) if an in-flight fuel check on a flight to an isolated destination shows that the usable fuel expected to remain at the point of the last possible diversion is less than the sum of the following:
  - (1) trip fuel from the point of the last possible diversion to the destination isolated aerodrome;
  - (2) contingency fuel; and
  - (3) FRF, or the additional fuel required for isolated aerodromes,the commander should either divert or proceed to the destination, provided that at onshore destinations, two suitable, separate touchdown and lift-off areas are available at the destination, and the expected weather conditions at the destination are as specified for planning in point CAT.OP.MPA.245(a).

## GM1 CAT.OP.MPA.195 Fuel/energy scheme — in-flight fuel/energy management policy — helicopters

### **'MINIMUM FUEL' DECLARATION**

- (a) The 'MINIMUM FUEL' declaration informs the ATC that all planned landing-site options have been reduced to a specific aerodrome or operating site of intended landing. It also informs the ATC that no other operating site is available, and that any change to the existing clearance, or air traffic delays, may result in landing with less than the planned FRF. This is not an emergency situation but an indication that an emergency situation is possible, should any additional delay occur.

**SAFE LANDING — final reserve fuel PROTECTION**

- (b) The protection of the FRF is intended to ensure that a safe landing is made at any aerodrome or operating site when unforeseen circumstances may not allow to safely complete the operation, as originally planned.
- (c) When the FRF can no longer be protected, then a fuel emergency needs to be declared, as per point CAT.OP.MPA.195(d), and any landing option explored, including deviating from rules, operational procedures, and methods in the interest of safety (as per point CAT.GEN.MPA.105(b)).
- (d) The 'MAYDAY MAYDAY MAYDAY FUEL' declaration informs the ATC that all available landing options have been reduced to a specific landing site, and that an FRF portion may be consumed prior to landing.

**AMC1 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****REFUELLING WITH AN ENGINE RUNNING — AEROPLANES**

- (a) Refuelling with an engine running should only be conducted:
  - (1) when there are no other sources of electrical or pneumatic power to start the engine if shut down;
  - (2) in accordance with the specific procedures established by the type certificate (TC) holder of the aeroplane;
  - (3) with aeroplanes that use JET A, JET A-1 or TS-1 fuel types or any other fuel type that has a flash point above 38 °C and is approved by the operators' competent authority;
  - (4) with no passengers embarking, on board, or disembarking;
  - (5) with permission from the aerodrome operator; and
  - (6) in the presence of the aerodrome rescue and firefighting services (RFFSs).
- (b) The operator should assess the risks associated with refuelling with an engine running and establish appropriate procedures to be followed by all involved personnel, such as flight crew, cabin crew, and ground operations personnel. These procedures should be specified in the OM.

**AMC2 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****OPERATIONAL PROCEDURES for REFUELLING WITH AN ENGINE RUNNING — AEROPLANES**

- (a) To reduce the likelihood of conducting refuelling with an engine running, the operator should include in the MEL an operational procedure for dispatch criteria in case of an unserviceable APU, if applicable, to prevent a flight from being dispatched to an aerodrome where no suitable ground support equipment is available.
- (b) Appropriate training should be provided to flight crew and maintenance/ground operations personnel that are involved in refuelling with one engine running, as well as to cabin crew, if present on board.

**AMC3 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING — HELICOPTERS**

- (a) Refuelling with the engine(s) running and/or rotors turning should only be conducted:
- (1) with no passengers or technical-crew members embarking or disembarking;
  - (2) if the operator of the aerodrome/operating site allows such operations;
  - (3) in accordance with any specific procedures and limitations in the AFM;
  - (4) using JET A or JET A-1 fuel types; and
  - (5) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment.
- (b) In addition, operational procedures in the OM should specify that at least the following precautions are taken:
- (1) all necessary information should be exchanged in advance with the aerodrome operator, operating-site operator, and refuelling operator;
  - (2) the procedures to be used by crew members should be defined;
  - (3) the procedures to be used by the operator's ground operations personnel that may be in charge of refuelling or assisting in emergency evacuations should be described;
  - (4) the operator's training programmes for crew members and for the operator's ground operations personnel should be described;
  - (5) the minimum distance between the helicopter turning parts and the refuelling vehicle or installations should be defined when the refuelling takes place outside an aerodrome or at an aerodrome where there are no such limitations;
  - (6) besides any RFFSs that are required to be available by aerodrome regulations, an additional handheld fire extinguisher with the equivalent of 5 kg of dry powder should be immediately available and ready for use;
  - (7) a means for a two-way communication between the crew and the person in charge of refuelling should be defined and established;
  - (8) if fuel vapour is detected inside the helicopter, or any other hazard arises, refuelling/defuelling should be stopped immediately;
  - (9) one pilot should stay at the controls, constantly monitor the refuelling, and be ready to shut off the engines and evacuate at all times; and
  - (10) any additional precautions should be taken, as determined by the risk assessment.

**AMC4 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****OPERATIONAL PROCEDURES — PASSENGERS ON BOARD for REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING — HELICOPTERS**

In addition to AMC3 CAT.OP.MPA.200, for refuelling with passengers on board, operational procedures in the OM should specify that at least the following precautions are taken:

- (a) the positioning of the helicopter and the corresponding helicopter evacuation strategy should be defined taking into account the wind as well as the refuelling facilities or vehicles;
- (b) on a heliport, the ground area beneath the exits that are intended for emergency evacuation should be kept clear;
- (c) an additional passenger briefing as well as instructions should be defined, and the 'No smoking' signs should be on unless 'No smoking' placards are installed;
- (d) interior lighting should be set to enable identification of emergency exits;
- (e) the use of doors during refuelling should be defined: doors on the refuelling side should remain closed, while doors on the opposite side should remain unlocked or, weather permitting, open, unless otherwise specified in the AFM;
- (f) at least one suitable person capable of implementing emergency procedures for firefighting, communications, as well as for initiating and directing an evacuation, should remain at a specified location; this person should not be the qualified pilot at the controls or the person performing the refuelling; and
- (g) unless passengers are regularly trained in emergency evacuation procedures, an additional crew member or ground crew member should be assigned to assist in the rapid evacuation of the passengers.

**GM1 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****OPERATIONAL PROCEDURES for REFUELLING WITH AN ENGINE RUNNING — AEROPLANES**

For the purpose of refuelling with an engine running, the operator's procedures need to be aligned with the specific procedures laid down in the AFM. In case there are no specific procedures for refuelling with an engine running available in the AFM, the operator and the manufacturer may wish to cooperate to establish such procedures.

**GM2 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft****RISK ASSESSMENT for REFUELLING WITH THE ENGINE(S) RUNNING AND/OR ROTORS TURNING — HELICOPTERS**

The risk assessment should explain why it is not practical to refuel with the engine(s) and rotors stopped, identify any additional hazards, and describe how the additional risks are controlled. Helicopter emergency medical services (HEMS) and helicopter offshore operations (HOFO) are typical operations where the benefits should outweigh the risks if mitigation measures are taken.

Guidance on safe refuelling practices is contained in ICAO Doc 9137 *Airport Services Manual*, Parts 1 and 8.



The operators' risk assessment may include, but not be limited to, the following risks, hazards and mitigation measures:

- (a) risk related to refuelling with rotors turning;
- (b) risk related to the shutting down of the engines, including the risk of failures during start-up;
- (c) environmental conditions, such as wind limitations, displacement of exhaust gases, and blade sailing;
- (d) risk related to human factors and fatigue management, especially for single-pilot operations for long periods of time;
- (e) risk mitigation, such as the safety features of the fuel installation, RFF capability, number of personnel members available, ease of emergency evacuation of the helicopter, etc.;
- (f) assessment of the use of radio transmitting equipment;
- (g) determination of the use of passenger seat belts;
- (h) review of the portable electronic device (PED) policy; and
- (i) if passengers are to disembark, consideration of their disembarking before rather than after the refuelling; and
- (j) if passengers are to embark, consideration of their embarking after rather than before the refuelling.

#### **AMC5 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft**

##### **REFUELLING OR DEFUELLING WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING**

- (a) When passengers are embarking, on board, or disembarking, an aircraft should not be refuelled/defuelled with avgas (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel.
- (b) For all other types of fuel, the necessary precautions should be taken, and the aircraft should be properly manned by qualified personnel that should be ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.

#### **AMC6 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft**

##### **OPERATIONAL PROCEDURES WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING — AEROPLANES**

- (a) When refuelling/defuelling with passengers on board, ground servicing activities and work inside the aeroplane, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and allow emergency evacuation through those aisles and exits that are intended for emergency evacuation.
- (b) The deployment of integral aeroplane stairs or the opening of emergency exits are not necessarily a prerequisite to refuelling.
- (c) Operational procedures should specify that at least the following precautions are taken:

- (1) one qualified person should remain at a specified location during refuelling/defuelling operations with passengers on board, and be capable of using emergency procedures for fire protection and firefighting, communications, as well as for initiating and directing an evacuation;
- (2) two-way communication should be established and remain available through the aeroplane's intercommunications system, or other suitable means, between the ground crew that supervises the refuelling and the qualified personnel on board the aeroplane; all involved personnel should remain within easy reach of the intercommunications system;
- (3) crew, personnel, and passengers should be warned that refuelling/defuelling will take place;
- (4) the 'FASTEN SEAT BELT' signs should be off;
- (5) 'NO SMOKING' signs should be on, together with interior lighting to allow the identification of emergency exits;
- (6) passengers should be instructed to unfasten their seat belts and refrain from smoking;
- (7) the minimum required number of cabin crew should be on board and prepared for an immediate emergency evacuation;
- (8) if fuel vapour is detected inside the aeroplane, or any other hazard arises, refuelling/defuelling should be stopped immediately;
- (9) the ground area beneath the exits that are intended for emergency evacuation, as well as slide deployment areas, should be kept clear where stairs are not in position for use in the event of evacuation; and
- (10) provision is made for a safe and rapid evacuation.

#### AMC7 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft

##### **OPERATIONAL PROCEDURES FOR REFUELLING WITH PASSENGERS DISEMBARKING OR EMBARKING — HELICOPTERS WITH THE ENGINE(S) AND ROTORS STOPPED**

When the helicopter engine(s) and rotors are stopped, the efficiency and speed of passengers disembarking from and re-embarking on board helicopters should be such that disembarking before refuelling and re-embarking after refuelling is the general practice, except for HEMS or air ambulance operations. However, if such operations are needed, the operator should refer to AMC3 CAT.OP.MPA.200 and AMC4 CAT.OP.MPA.200. Operational procedures to be described in the OM should specify that at least the relevant precautions referred to in the aforementioned AMC are taken.

#### AMC8 CAT.OP.MPA.200 Special refuelling or defueling of the aircraft

##### **REFUELLING OR DEFUELLING WITH WIDE-CUT FUEL**

Refuelling/defuelling with wide-cut fuel should be conducted only if the operator has established appropriate procedures, taking into account the high risk of using wide-cut fuel types.

**GM34 CAT.OP.MPA.200 Special refuelling or defuelling of the aircraft Refuelling/defuelling with wide-cut fuel****PROCEDURES FOR REFUELLING/DEFUELLING WITH WIDE-CUT FUEL**

[...]

**AMC1 CAT.OP.MPA.281 In-flight fuel management – helicopters****COMPLEX MOTOR-POWERED HELICOPTERS, OTHER THAN LOCAL OPERATIONS**

The operator should base in-flight fuel management procedures on the following criteria:

(a) ~~In-flight fuel checks~~

~~(1) The commander should ensure that fuel checks are carried out in flight at regular intervals. The remaining fuel should be recorded and evaluated to:~~

- ~~(i) compare actual consumption with planned consumption;~~
- ~~(ii) check that the remaining fuel is sufficient to complete the flight; and~~
- ~~(iii) determine the expected fuel remaining on arrival at the destination.~~

~~(2) The relevant fuel data should be recorded.~~

(b) ~~In-flight fuel management~~

~~(1) If, as a result of an in-flight fuel check, the expected fuel remaining on arrival at the destination is less than the required alternate fuel plus final reserve fuel, the commander should:~~

- ~~(i) divert; or~~
- ~~(ii) replan the flight in accordance with SPA.HOFO.120 unless he/she considers it safer to continue to the destination.~~

~~(2) At an onshore destination, when two suitable, separate touchdown and lift-off areas are available and the weather conditions at the destination comply with those specified for planning in CAT.OP.MPA.245(a)(2), the commander may permit alternate fuel to be used before landing at the destination.~~

~~(c) If, as a result of an in-flight fuel check on a flight to an isolated destination, planned in accordance with (b), the expected fuel remaining at the point of last possible diversion is less than the sum of:~~

- ~~(1) fuel to divert to an operating site selected in accordance with CAT.OP.MPA.181(a);~~
- ~~(2) contingency fuel; and~~
- ~~(3) final reserve fuel;~~

~~the commander should:~~

- ~~(i) divert; or~~
- ~~(ii) proceed to the destination provided that at onshore destinations, two suitable, separate touchdown and lift-off areas are available at the destination and the~~

~~expected weather conditions at the destination comply with those specified for planning in CAT.OP.MPA.245(a)(2).~~

### GM1 CAT.POL.H.215(b)(3) En-route — critical engine inoperative

#### FUEL JETTISON

The presence of obstacles along the en-route flight path may preclude compliance with **point** CAT.POL.H.215-(a)(1) ~~at~~**with** the planned mass at the critical point along the route. In this case, fuel jettison at the most critical point may be planned, provided that the procedures of **point (d)** ~~(e)~~ **in** of ~~AMC3 CAT.OP.MPA.150(b)~~ **AMC1 CAT.OP.MPA.191(b)&(c)** are complied with.