European Union Aviation Safety Agency

Opinion No 02/2020

Fuel/energy planning and management

RELATED NPAS/CRDS 2016-06 (A), (B) & (C) — RMT.0573

EXECUTIVE SUMMARY

The objectives of this Opinion are:

— to improve efficiency in the field of fuel/energy planning and management for commercial air transport (CAT) aeroplanes, while maintaining a high level of safety in air operations;
— to incorporate into EU rules the latest International Civil Aviation Organization (ICAO), Annex 6, Parts I, II, and III amendments on fuel planning and management ; and
— to clarify and simplify the rules for helicopter fuel energy planning and management, including helicopter refuelling with rotors turning, taking into account current industry best practice.

The new rules on fuel planning, selection of aerodromes, and in-flight fuel management introduce the concept of 'fuel schemes' for CAT operations with aeroplanes in the European Union. They provide a comprehensive and updated set of safety requirements for developing and overseeing the operators' fuel schemes, and address the gaps identified in the in-flight fuel management policy to enable operators to benefit from the latest technologies. The new fuel schemes that are structured on three levels of performance take into account the robustness of the operators' management system, allowing them to increase operational efficiency, with cost and environmental benefits.

The rules on other types of operations are also amended for consistency. The requirements of Annexes VI (Part-NCC) and VIII (Part-SPO) to Regulation (EU) No 965/2012 (the 'Air OPS Regulation') are better harmonised with those of Annex IV (Part-CAT) for CAT operations that are based on the new fuel schemes. In Annex VII (Part-NCO), the amendments to fuel planning rules follow a performance-based approach. The in-flight fuel management requirements of Part-NCC and Part-NCO are now harmonised with ICAO Annex 6, Part II. In Part-SPO, the prescriptive rule for the final reserve fuel (FRF) is amended following the performance-based approach taken for Part-NCO.

This Opinion replaces the term 'fuel' with 'fuel/energy' to accommodate operations with aircraft that use energy sources for propulsion other than conventional, hydrocarbon-based fuel.

Action area:	Aeroplane and helicopter flight operations		
Affected rules:	— Annexes I-VIII to the Air OPS Regulation — AMC & GM to Annexes I-VIII to the Air OPS Regulation		
Affected stakeholders:	Competent authorities, aircraft operators		
Driver:	Level playing field	**Rulemaking group:**	Yes
Impact assessment:	Light	**Rulemaking Procedure:**	Standard

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1. About this Opinion

1.1. How this Opinion was developed

The European Union Aviation Safety Agency (EASA) developed this Opinion in line with Regulation (EU) 2018/1139[1] ('Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the European Plan for Aviation Safety (EPAS) 2020-2024 under rulemaking task RMT.0573. The scope and timescales of the task were defined in the related ToR.

The *draft* text of this Opinion has been developed by EASA based on the input of Review Group (RG) RMT.0573. All interested parties were consulted through NPAs 2016-06 (A), (B) & (C)[3]:

(a) NPA 2016-06 (A) contained the draft proposal for aeroplanes of Annex I (Definitions), Annex II (Part-ARO), Annex III (Part-ORO), and Annex IV (Part-CAT) to Regulation (EU) No 965/2012[4] (the 'Air OPS Regulation');

(b) NPA 2016-06 (B) contained the draft proposal for helicopters of Annex I (Definitions), Annex IV (Part-CAT), Annex V (Part-SPA), Annex VI (Part-NCC), Annex VII (Part-NCO), and Annex VIII (Part-SPO) to the Air OPS Regulation; and

(c) NPA 2016-06 (C) contained the draft proposal for aeroplanes and helicopters of Part-NCC, Part-NCO, and Part-SPO of the Air OPS Regulation.

203 comments to sub-NPA (A), 93 comments to sub-NPA (B), and 47 comments to sub-NPA (C) were received from interested parties, including industry, national aviation authorities (NAAs), pilot associations, aerodrome associations, and associations of other related professional occupations (e.g. flight dispatchers (FDs)).

EASA reviewed and responded to the comments received on all three sub-NPAs 2016-06 with the support of RG RMT.0573. The comments received and EASA's responses to them are presented in Comment-Response Documents (CRDs) 2016-06 (A), (B), and (C)[5], and are also summarised under Section 2.4 of this Opinion. Please note that the aforementioned CRDs will be published at a later stage.

The *final* text of this Opinion and the draft regulation has been developed by EASA based on the input of RG RMT.0573 and a focused consultation. EASA held a focused consultation with its relevant

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1 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845&uri=CELEX:32018R1139).

2 EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

3 In accordance with Article 52 of Regulation (EC) No 216/2008 and Articles 6(3) and 7 of the Rulemaking Procedure.

4 Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580979298891&uri=CELEX:32012R0965)

5 http://easa.europa.eu/document-library/comment-response-documents

Advisory Bodies (ABs), and the comments received were taken into account in the *final* text of this Opinion. The draft rule text proposed by EASA is published on the EASA website[6].

The major milestones of this rulemaking activity are presented on the title page.

1.2. The next steps

This Opinion contains the proposed amendments to the Air OPS Regulation and their potential impacts. It is submitted to the European Commission, which will use it as a technical basis to prepare an EU regulation.

For information, EASA published the draft annex to the related EASA decision that contains the related acceptable means of compliance (AMC) and guidance material (GM). The final decision that amends the AMC & GM will be published by EASA once the European Commission has adopted the regulation.

6 http://easa.europa.eu/document-library/opinions

2. In summary — why and what

2.1. Why we need to change the rules — issue/rationale

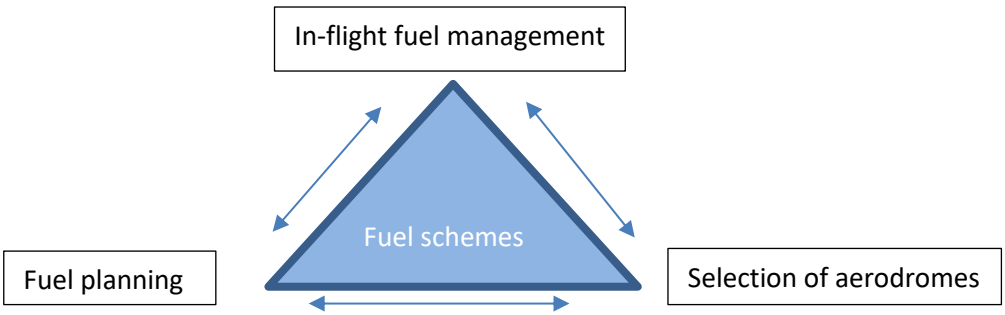
2.1.1. CAT operations with aeroplanes

The concept of 'fuel scheme'

The introduction of ICAO Standards and Recommended Practices (SARPs) 4.3.4.4[7] and 4.3.6.6[8] by Amendment 38 to ICAO Annex 6, Part I, followed by ICAO Doc 9976 'Flight Planning and Fuel Management (FPFM) Manual' (1st Edition, 2015), initiated the discussion.

This Opinion introduces into Annex IV (Part-CAT) to Regulation (EU) No 965/2012 (the 'Air OPS Regulation') a new concept ('fuel schemes') for commercial air transport (CAT) aeroplanes.

Recognising their interrelationships, the 'fuel scheme' integrates the fuel planning policy with the selection of aerodromes and the in-flight fuel management policies as follows:



[7] 'Notwithstanding the provisions of 4.3.4.1, 4.3.4.2 and 4.3.4.3, the State of the Operator may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the:

(a) capabilities of the operator;

(b) overall capability of the aeroplane and its systems;

(c) available aerodrome technologies, capabilities and infrastructure;

(d) quality and reliability of meteorological information;

(e) identified hazards and safety risks associated with each alternate aerodrome variation; and

(f) specific mitigation measures.'

[8] 'Notwithstanding the provisions of 4.3.6.3 a), b), c), d) and f), the State of the Operator may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve variations to the pre-flight fuel calculation of taxi fuel, trip fuel, contingency fuel, destination alternate fuel, and additional fuel. The specific safety risk assessment shall include at least the:

(a) flight fuel calculations;

(b) capabilities of the operator to include:

(1) a data-driven method that includes a fuel consumption monitoring programme; and/or

(2) the advanced use of alternate aerodromes; and

(c) specific mitigation measures.'

— Interrelationship between the preflight fuel calculation and selection of aerodromes under the ICAO provisions

For the preflight fuel calculation ('fuel planning') and selection of aerodromes, ICAO Doc 9976 and ICAO Annex 6, Part I clearly indicate (see aforementioned ICAO SARPS 4.3.4.4 and 4.3.6.6) that preflight fuel calculation and selection of aerodromes depend on each other: 'based on the results of a specific safety risk assessment (…) variation to the pre-flight fuel calculation (…) shall include at least (…) use of alternate aerodromes (…)'.

— Interrelationship between the in-flight fuel management, preflight fuel calculation, and selection of aerodromes

The RMG acknowledged the interrelationship between the in-flight fuel management and the two above-mentioned policies although ICAO did not explicitly take this approach. The RMG's study of several incidents or serious incidents where aircraft landed or could have landed with less than the final reserve fuel (FRF) supported this approach. The study showed that when the outcome of the reviewed events was successful, this was due to the effective in-flight fuel management policy applied by the flight crew and to the capabilities of the operators' operational control system (cf. closure of the London Heathrow Airport on 12 July 2013).

The outcome of the study on in-flight fuel management can be summarised as follows:

— the consequences of poor fuel planning and/or poor selection of aerodromes will be borne during flight, where the situation will need to be handled accordingly by applying the in-flight fuel management policy;

— a good flight planning alone does not guarantee a safe outcome without proper in-flight fuel management; the same principle applies to the selection of aerodromes;

— the combination of a good fuel planning policy and a poor in-flight fuel management policy may lead to an unsafe fuel situation (e.g. fuel emergency, minimum fuel or similar); and

— conversely, poor flight planning will probably have a safe outcome with proper in-flight fuel management (e.g. early diversion to an alternate aerodrome to refuel).

Therefore, the RMG reached full consensus on that matter, and the need for an integrated approach that encompasses all three policies became apparent: the 'fuel scheme'. The RG continued with the RMG's approach.

A 'fuel scheme' requires prior approval by the competent authority, as does the current fuel policy (see CAT.OP.MPA.150). It integrates the fuel planning policy with the selection of aerodromes policy and the in-flight fuel management policy (see the new CAT.OP.MPA.180).

Following a performance-based approach, the regulatory proposal consists of:

— implementing rules (IRs), where the safety objectives are defined;

— AMC that provide three different means to meet the safety objectives: a basic fuel scheme, a basic fuel scheme with variations, and an individual fuel scheme; they allow operators to fully customise their fuel planning, aerodrome selection and in-flight fuel management policies, provided that they satisfy certain conditions; and

— GM that provide additional explanations, clarifications, and references to related ICAO documentation.

The proposed 'fuel scheme' concept is similar to the current flight time specification schemes (see Subpart ORO.FTL of Annex III (Part-ORO) to the Air OPS Regulation).

2.1.2. Helicopter operations (Part-CAT, and Annex V (Part-SPA), Annex VI (Part-NCC), Annex VII (Part-NCO), and Annex VIII (Part-SPO) to the Air OPS Regulation)

This Opinion also addresses fuel issues that are specific to helicopter operations.

Safety issues are addressed in the area of refuelling and in-flight fuel management, while simplification, clarification, and consistency issues are addressed in the area of fuel planning.

2.1.2.1 Refuelling

This Opinion proposes changes to the Air OPS Regulation to address the safety-related issues of refuelling with passengers on board, embarking, disembarking, or refuelling with rotors turning.

Refuelling with engines running and/or rotors turning is a common practice in the helicopter domain; however, it is riskier than refuelling with engines shut down and rotors stopped, and requires the use of specific procedures. This is not reflected in the current rule.

Refuelling with rotors turning is used mainly in offshore operations and aerial work. Offshore operations are typically conducted in accordance with very high standards, which were taken into account when drafting NPA 2016-06 (B). Specialised operations (SPO) (aerial work) were regulated by national rules until April 2017, and since then, refuelling with rotors turning in SPO has been unregulated. Therefore, aerial work safety may negatively evolve in the near future.

EASA's Safety Risk Portfolio — Offshore Helicopters (see Annual Safety Review 2014) recognises the proper in-flight management of fuel on board as a safety issue. This safety issue can be extended to on-shore helicopter operations.

Since the NPA 2016-06 (B) publication, ICAO has finalised an amendment to its Annex 6, Part III on helicopter refuelling. This Opinion is harmonised with ICAO, except for the following elements:

— New ICAO standard that prohibits oxygen replenishing when conducting helicopter refuelling/defuelling operations. EASA considered that the training and licencing for aircraft maintenance technicians, together with any national rules on refuelling, should be sufficient to meet the safety objectives of this standard.

— New ICAO standard that prohibits refuelling with rotors stopped and passengers disembarking/embarking. EASA decided that the risks involved in such operations could be mitigated and that the operations should not be banned. The Air OPS rules for helicopters should therefore remain performance-based and harmonised with the aeroplane rules.

— New ICAO recommended practice regarding the use of seat belts during refuelling with rotors turning and passengers on board. EASA decided not to implement this recommended practice and let operators define their procedures for the use of seat belts based on their risk assessment.

2.1.2.2 Fuel planning and selection of aerodromes

The Opinion proposes to clarify the rule text of the current alleviations of CAT.OP.MPA.151 and SPA.HEMS.150.

Furthermore, it proposes to achieve consistency throughout all related Annexes to the Air OPS Regulation so that the FRF is calculated in the same way, whether using Part-CAT, Part-NCC, Part-NCO or Part-SPO (with or without the alleviations of CAT.OP.MPA.151 and SPA.HEMS.150).

The Opinion proposes that helicopter rules remain harmonised with the new terminology and regulatory structure that are introduced for aeroplane operations, taking into account any helicopter specifics and maintaining the relative simplicity of helicopter rules.

2.1.2.3 In-flight fuel management

The Opinion proposes to ensure harmonisation with ICAO regarding in-flight fuel management for helicopters.

2.1.3. Non-commercial operations with aeroplanes (Part-NCC, Part-NCO, Part-SPO)

2.1.3.1 Part-NCC and Part-SPO

The current fuel planning and management requirements of Part-NCC are difficult to apply, inconsistent as they are with the requirements of Part-CAT and ICAO Annex 6, Part II, Chapter 3.

For consistency reasons, and although ICAO Annex 6, Part II is not applicable to specialised operations (Part-SPO), all changes and reasoning of Part-NCC are also applied to Part-SPO to keep the two Parts harmonised.

2.1.3.2 Consistency across operations

Many business aircraft are used for both non-commercial and CAT operations, often with the same crews. There is an argument that Part-CAT operations have a higher acceptable level of safety than Part-NCC operations and that, therefore, the requirements of Part-NCC are more relaxed. However, in practice, those two different types of operations have very similar operating characteristics.

One significant anomaly in the current rules is the operating capacity of the FRF required: 30 minutes for turbine-engined aircraft operating under Part-CAT, but 45 min for those operating under Part-NCC. This discrepancy does not make any sense, hence, consistency is required across these operations to avoid unnecessary complexity for crews.

2.1.3.3 Tailored for complex motor-powered aircraft

The Part-NCC fuel scheme is based on the Part-NCO fuel scheme. The latter is not well suited for turbine-powered aircraft, as it requires a fuel reserve for 45 minutes ‘at normal cruising level’. This makes little sense as a fuel reserve for an aircraft that flies at cruising level with a flight level (FL) varying from 250 to 410 ft when it has just missed an approach at sea level. By contrast, Part-CAT requires 30 minutes at holding speed at 1 500 ft (450 m) above aerodrome elevation, which is aircraft performance data that is typically provided by the manufacturer.

2.1.3.4 Harmonisation with ICAO Annex 6, Part II, Amendment 33

ICAO Annex 6, Part II, Section 2 is applicable to all General Aviation (GA) aircraft. However, Section 3 contains additional rules for large and turbojet aircraft. The fuel planning rules of Section 3 are

considerably more similar to the requirements of Part-CAT than to those of Part-NCC. Harmonisation of Part-NCC with the ICAO SARPs is therefore desirable.

The community of NCC and NCO operators nominated a subgroup from RG RMT.0573 to review the specific comments received on NPA 2016-06 (C) that proposed amendments to the fuel requirements for non-commercial operations performed with complex aeroplanes.

The revision of rules proposed through this Opinion aims at improving consistency with ICAO SARPs, as well as across all Annexes to the Air OPS Regulation; therefore, Part-SPO is also amended.

For a more detailed analysis of the issues addressed by this Opinion, please refer to Section 2.3.1 'RIA summary' below.

2.1.3.4 Part-NCO

In response to the European GA safety strategy, the GA community identified NCO.OP.125, NCO.OP.126, and especially NCO.OP.185 as requirements that are inconsistent with the principles of the aforementioned strategy and EASA's performance-based approach to regulating this sector. In particular:

— the prescriptive nature of the fuel planning and management rules does not take into account the broad range of activities undertaken under Part-NCO; and

— the current rules aim to achieve a level of safety that is appropriate for CAT operations, which is disproportionate to the level of safety required for GA.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

2.2.1. CAT operations with aeroplanes

The specific objectives of this proposal for CAT operations with aeroplanes are to:

(a) maintain a high level of aviation safety by:

  (1) addressing Safety Recommendation (SR) FRAN-2012-026;

  (2) incorporating the content of Safety Information Bulletin (SIB) 2018-08 on the phraseology for fuel-related messages between pilots and air traffic control (ATC) into the applicable rules of the Air OPS Regulation; and

  (3) incorporating the content of SIB 2014-16 on aeroplane refuelling with one engine running to the applicable rules of the Air OPS Regulation;

(b) ensure harmonisation with ICAO SARPs by incorporating into EU rules the latest amendments to ICAO Annex 6, Parts I, II and III regarding fuel planning and in-flight fuel management;

(c) clarify the current rules on fuel planning, refuelling procedures, and in-flight fuel management;

(d) ensure consistency of fuel-related rules across all applicable Parts of the Air OPS Regulation for motor-powered aircraft, where appropriate;

(e) ensure the correct balance between IRs and AMC & GM; and

(f) ensure, when possible, an adequate environmental protection.

2.2.2. Helicopter operations (Part-CAT, Part-SPA, Part-NCC, Part-NCO, and Part-SPO)

The specific objectives of this proposal for helicopter operations are to:

(a) regulate helicopter refuelling with rotors turning to harmonise it with the current industry best practice, and ensure the greatest possible harmonisation with Amendment 22 to ICAO Annex 6, Part III;

(b) pursue ICAO developments that are included in ICAO State Letter AN 11/32.3.11-14/11 of 7 April 2014, subject to Amendment 19 to ICAO Annex 6, Part III;

(c) harmonise EU rules for in-flight fuel management with the current ICAO SARPs; and

(d) clarify and simplify the rules for helicopter fuel planning.

2.2.3. Non-commercial operations with aeroplanes and helicopters (Part-NCC, Part-NCO, and Part-SPO)

The specific objective of this proposal for non-commercial operations with aeroplanes and helicopters is to provide proportionate and harmonised rules on fuel planning and management for non-commercial operators, keeping an appropriate balance between Part-NCC and Part-NCO and the related AMC & GM.

2.3. How we want to achieve it — overview of the proposals

A summary of the regulatory impact assessment (RIA) for all types of operations can be found below. A detailed analysis can be found in NPAs 2016-06 (A), (B), and (C).

2.3.1. Regulatory impact assessment (RIA) summary

2.3.1.1 CAT operations with aeroplanes

Summary of the original RIA of NPA 2016-06 (A)

The most significant and radical changes were proposed to aeroplane operations in Part-CAT. Three options were proposed, which were assessed using a multi-criteria analysis (MCA) method:

— Option 0: do nothing, no change in the current prescriptive requirements;

— Option 1: slightly amend the rules and introduce minimal reductions in fuel burn; and

— Option 2: implement performance-based rules that rely on statistical analysis and depend on the maturity of the operators and their competent authority, for the purpose of increasing efficiency/flexibility in fuel planning and management, while maintaining safety.

Option 2 was the preferred one; the operators may choose to follow either:

— the current prescriptive requirements of the Air OPS Regulation; or

— EASA-established variations (e.g. the 3 % contingency, or new variations EASA may decide to develop); or

— an individual fuel scheme, designed according to fully performance-based rules that allow for an increase in efficiency/flexibility in fuel planning and selection of aerodromes; the application

of an individual fuel scheme depends on the maturity of the operators and their competent authority and has further potential to reduce fuel consumption.

Option 2 proposes flexible rules that allow operators to choose the most appropriate level of prescription (or flexibility) for their fuel planning, selection of aerodromes, and in-flight fuel management policies. However, the choice of those three levels depends on fulfilling certain conditions in the AMC & GM, which relate to the maturity of the operators and their competent authority.

RIA update for the new CAT.OP.MPA.182 and related AMC

Background

As already highlighted in the NPA 2016-09 (A) RIA, the fuel scheme is composed of three policies:

— fuel planning policy;

— selection of aerodrome policy;

— in-flight fuel management policy.

When evaluating the impact of fuel schemes, the aerodrome selection policy plays an important role in the fuel planning policy. ICAO Doc 9976 and ICAO Annex 6, Part I clearly indicate that pre-flight fuel calculation and selection of aerodromes depend on each other: *based on the results of a specific safety risk assessment (…) variation to the pre-flight fuel calculation (…) shall include at least (…) use of alternate aerodromes (…)*. Furthermore, the current CAT.OP.MPA.180 and CAT.OP.MPA.185, which contain the aerodrome selection policies, follow a prescriptive approach. Under the current prescriptive rules, operators with a good planning system and solid in-flight fuel management procedures, which allow for an efficient use of fuel reserves for holding due to unforeseen circumstances, are still unable to apply a different, more cost-effective fuel policy.

Following suggestions from the comments received on NPA 2016-06 (A), RG RMT.0573 redrafted the rules on the aerodrome selection policy in the new CAT.OP.MPA.182 (CAT.OP.MPA.183 in NPA 2016-09 (A)) and related AMC & GM. Those rules became obsolete when ICAO amended its Annex 6, and the approach classification was replaced by the new one.

The following supplementary analysis evaluates the new rules for the basic aerodrome selection policy, which is the most prescriptive one.

This policy is harmonised with the extended-range twin operations (ETOPSs) aerodrome selection policy and it provides for the following flat increments:

— 1500-m increment of visibility and 400-ft increment to the decision altitude/height (DA/H) for type-A instrument approaches; or

— 800-m increment of visibility and 200-ft increment to the DA/H for type-B instrument approaches,

where

— type A means an instrument approach with a DA/H above 250 ft; and

— type B means an instrument approach with a DA/H below 250 ft.

The new rules provide for a level of protection equivalent to the current ones as:

- the current rules increase the visibility and DA/H of an instrument landing system (ILS) CAT III approach to the visibility and DA/H of an ILS CAT I; and
- the new rules provide for a similar increment of 800-m visibility and of 200-ft DA/H to an ILS CAT III approach as:
  - according to the new approach classification, an ILS CAT III approach with 75-m visibility and 0-ft DA/H is a type-B approach;
  - the new rules require an increment of 800-m visibility and 200-ft DA/H for a type-B instrument approach;
  - the result of such increment would be an approach with 875-m visibility and 200-ft DA/H; and
  - these approach minima are similar to those of an ILS CAT I: standard 800-m visibility and not less than 200-ft DA/H.
- the same protection applies to ILS CAT I approaches as:
  - current rules increase the minima from an ILS CAT I to a localiser approach (no glide slope);
  - according to the new approach classification, ILS CAT I approach is a type-B instrument approach;
  - the new rules provide for a flat increment of 800-m visibility and 200-ft DA/H; and
  - both increments are similar.
- the same protection applies to non-precision approaches as:
  - according to the current rules, non-precision approach minima are increased to circling minima;
  - the new rules require an increment of 1500-m visibility and 400-ft DA/H; and
  - both increments are very similar.

However, ICAO proposes an exception to the new approach classification. There are a few ILS approaches with minima above 250 ft. According to the new ICAO classification, those ILS approaches are now classified as type-A instrument approaches. This results in an increase of 1500-m visibility and 400-ft DA/H on such aerodromes, instead of the increment of 800-m visibility and 200-ft DA/H for type-B approaches. Therefore, the proposal increases the protections for this type of ILS approaches.

According to the preferred RIA option of NPA 2016-06 (A), Option 2, in 95 % of the short/medium-haul flights that are affected by the shift to type-A and type-B approaches, an alternate aerodrome will have to be selected. For the remaining 5 % of the flights, where no alternate aerodrome needs to be selected, additional fuel for a 15-minute holding is required, which corresponds to 25 % of the FRF. This Option, however, leads to an overall fuel reduction that is not available for the other two Options.

The new types of instrument approaches (types A and B) were not introduced in NPA 2016-06 (A), but they had already been included in ICAO Annex 6 when the final text of this Opinion was drafted. The definitions of the new instrument approach procedures (type A and type B) were published in NPA 2018-06 (C) 'All-weather operations' (RMT.0379). Starting from the decision to include the new

instrument approach procedures in the fuel rules, RG RMT.0573 challenged the current planning-minima table for CAT operations with aeroplanes. Hence, Table 2 of AMC6 CAT.OP.MPA.182 and Table 3 of AMC8 CAT.OP.MPA.182 that present the planning minima for the basic fuel scheme and the basic fuel scheme with variations, respectively, were created. In addition, EASA held a focused consultation with national aviation authorities (NAAs) and industry during the last development phase of the new rules. At the same time, when RG RMT.0573 created the two new tables, it recognised the need for a RIA, considering that aerodromes would be affected by this change.

Therefore, the following subsection contains the impact assessment of the developments described above.

Methodology

The analysis initially focused on aerodromes worldwide with at least one ILS with a DA/H above 249 ft. To limit the analysis to the relevant aerodromes that are impacted by the change explained above, the following selection criteria were gradually applied to narrow down the initial list of aerodromes:

— only European aerodromes;

— only aerodromes in EASA Member States;

— only aerodromes within EASA's scope (more than 10 000 passengers or 800 cargo flights per year);

— only aerodromes with at least 500 000 passengers per year, which allowed the analysis to focus on potential high negative/positive economic impacts;

— only aerodromes with at least one type-A precision approach above DH 249 ft (namely those precision approaches that as per the current rules, had the minimum increment but now are categorised as type A and therefore are required to have the maximum increment); and

— aerodromes with a precision approach above DH 249 ft, which are only used when they have an unserviceable equipment (U/S), were excluded from the analysis.

  The reason for excluding these aerodromes is that they have a standard precision approach (type-B precision approach) and therefore normally apply the reduced increment. They only use the non-standard approaches (type-A precision approaches) for contingency reasons (e.g. lights problems, as in runway 31 of the Badajoz Airport (ICAO code: LEBZ) for the ILS approach: CAT I VHF omnidirectional range (VOR)/distance measuring equipment (DME) approach lighting system (ALS) U/S).

Aerodrome (ICAO code)	Country	Number of passengers in 2016 (*2017)	Impact
EGLC	UNITED KINGDOM	4 538 735	Negative
ENBO	NORWAY	1 830 581*	Negative
ENEV	NORWAY	754 604*	Both positive and negative
ENTC	NORWAY	2 267 808*	Negative
LDSP	CROATIA	2 262 991	Positive
LEAL	SPAIN	12 344 945	Positive
LEBB	SPAIN	4 588 339	Positive
LECO	SPAIN	1 063 291	Negative
LEGR	SPAIN	751 287	Positive
LEXJ	SPAIN	778 316	Positive
LFKJ	FRANCE	1 422 048	Both positive and negative
LIBR	ITALY	2 321 868	Negative
LICJ	ITALY	5 314 588	Negative
LIEA	ITALY	1 343 752	Both positive and negative
LIEO	ITALY	2 541 510	Negative
LIMJ	ITALY	1 268 123	Negative
LIRA	ITALY	5 395 699	Negative
LIRN	ITALY	6 766 721	Both positive and negative
LIRQ	ITALY	2 515 111	Negative
Total number of passengers positively affected		20 725 878	
Total number of passengers negatively affected		24 267 808	
Total number of passengers neither positively nor negatively affected		10 287 125	

For each selected aerodrome, the analysis identified whether the new rules affect operations during some of their approaches, thus leading to potential diversions/cancellations.

With the new instrument approach procedures (type A and B), some aerodromes will become more restrictive for certain aeroplanes in terms of landing in certain conditions. At the same time, other aerodromes will become more accessible than with the old approach procedures (non-precision or precision approaches).

The increased accessibility of a runway could have a positive economic impact as it would result in more flights for that aerodrome. It would also have a positive social impact as more movements on that aerodrome would trigger an increase in employment opportunities.

For the aerodromes impacted negatively, it is expected that on the days when landing is restricted due to unfavourable weather conditions, flights will be diverted or even cancelled. Additional fuel for such diversions results in a negative economic impact for aircraft operators.

The overall impact on an aerodrome is assessed as positive if more or all of its runways become accessible with the new instrument approach procedures. Likewise, if fewer to none of the runways of an aerodrome become accessible with the new instrument approach procedures, the impact is assessed as negative. If the analysis mentions 'negative/positive', this means that for the same aerodrome, some runways are affected positively and some negatively.

For example, for the aerodrome with the highest number of passengers in the table above, LEAL (Alicante), the impact is positive. For the second largest aerodrome in the same table, LIEA (Alghero), the impact is positive for one runway and negative for the other. For several smaller aerodromes, the impact is negative for the whole aerodrome (all runways).

Looking at the total number of affected passengers in the table, the overall impact might be assessed as slightly negative. Indeed, the total number of passengers affected negatively is higher than the number of passengers that would benefit from the new approach types.

However, this comparison does not take into account the aerodromes that are affected both positively and negatively. Moreover, the aerodromes where landing will be restricted due to bad weather conditions will likely be affected only a few days per year. Further analysis of past years' data is required to calculate the exact number of days per year on which such aerodromes are negatively impacted.

Therefore, the final assessment of Option 2 in NPA 2016-06 (A) remains unchanged.

2.3.1.2 Helicopter operations (Part-CAT, Part-SPA, Part-NCC, Part-NCO, and Part-SPO)

The analysis of the NPA 2016-06 (B) RIA considered the following options:

— Option 0: do not change the rules (baseline option);

— Option 1: amend the Air OPS Regulation with regard to fuel policy (including in-flight fuel management) in accordance with ICAO Annex 6, Part III, Amendment 19;

— Option 2: regulate helicopter refuelling with rotors turning (hot refuelling); and

— Option 3: propose a regulatory package that combines Option 1 with Option 2.

The comparison of the Options, which was based on an MCA, indicated that Option 3 is the preferred and therefore developed one.

2.3.1.3 Non-commercial operations with aeroplanes (Part-NCC, Part-NCO, and Part-SPO) and helicopters (Part-NCO)

Part-NCC and Part-SPO — Aeroplanes

The RIA examined the possibilities of transposing into Part-NCC rules from Part-NCO, from the basic fuel scheme of Part-CAT, or from ICAO Annex 6, Part II, Section 3. It indicated that the last two options

would have the most positive impact, with a slight preference for harmonising Part-NCC with Part-CAT, which in turn is, to a substantial degree, harmonised with ICAO Annex 6, Part II, Section 3. Harmonisation of Part-NCC with Part-CAT was therefore EASA's preferred option (Option 2).

Part-SPO was included in the Part-NCC RIA for consistency reasons. Part-SPO and Part-NCC are fully harmonised in terms of fuel planning and selection of destination alternates, therefore, changes to Part-NCC implied analogous changes to Part-SPO. However, Part-NCC rules on the FRF are harmonised with Part-NCO rules.

Part-NCO — Aeroplanes and helicopters

The RIA identified major economic and GA proportionality benefits that accrue from amending a safety-objective-based rule, as well as minor environmental and harmonisation benefits. Based on the safety analysis performed, there is no anticipated change to safety performance. Option 2 was the preferred one as it proposed to amend Part-NCO by introducing safety-objective-based fuel planning rules and leaving FRF to the discretion of the pilot in command (PIC).

For a more detailed RIA, please refer to NPA 2016-06 (C).

2.3.2. Overview of the proposals

2.3.2.1 Overview of changes to CAT operations —aeroplanes and helicopters

In the context of the new fuel rules, the term 'scheme' refers to the entire system that addresses fuel planning and management, while the term 'policy' refers to one of the three components that define a fuel scheme: fuel planning, selection of aerodromes, and in-flight fuel management.

Although not entirely new, the new fuel rules are difficult to trace back to the current rules for several reasons:

(a) parts of the current IRs are moved to new IRs or several AMC; for example, point CAT.OP.MPA.150 is deleted and part of its text is moved to the new points CAT.OP.MPA.181 and CAT.OP.MPA.191;

(b) parts of current AMC & GM are either deleted, or amended and moved in new IRs or new AMC with a different number: e.g. AMC1 CAT.OP.MPA.150(b) is split, amended, and moved to the new point CAT.OP.MPA.191, AMC1 CAT.OP.MPA.181 and AMC2 CAT.OP.MPA.181, or e.g. the current GM2 CAT.OP.MPA.185 is moved to the new AMC3 CAT.OP.MPA.182;

(c) parts of the current IRs, AMC, and GM are deleted; and

(d) some IRs, AMC, and GM are renumbered to group the fuel rules more logically within Part-CAT.

When drafting the responses to the comments received on NPA 2016-06(A), RG RMT.0573 identified the comments that were signalling some inconsistencies of the NPA rule text. While addressing them, the RG realised that the identified issues were more complex. Additional clarifications and further changes to the NPA text were necessary. That explains why the Opinion includes as an appendix draft new AMC & GM, and why the proposed IRs in NPA 2016-06 (A) are partly rearranged and amended in the Opinion.

A mature draft of the rules for Part-CAT and related AMC & GM was lastly consulted in 2018 with the EASA Advisory Bodies (ABs) (NAAs and industry). The final text of this Opinion addresses also the latest comments and proposals made during that consultation.

The order of the amended rules follows the logical planning and execution of a flight: from stating the general fuel policy to fuel planning (in-flight replanning should include the same steps as preflight planning), aerodrome selection policy, and in-flight fuel management. Consequently, all the fuel scheme requirements for CAT operations with aeroplanes are now in points CAT.OP.MPA.180 to 189, and for helicopters in points CAT.OP.MPA.190 to 199.

In the IRs, the term 'fuel' is replaced with 'fuel/energy' wherever fuel is used for propulsion purposes. A combined term was preferred ('fuel/energy') instead of the more restrictive 'fuel' to cover any type or source of energy for propulsion purposes. This way, the new rules will accommodate also new aircraft that use other energy than fuel for propulsion.

The AMC & GM are intentionally left unchanged to allow sufficient flexibility to operators of aircraft that use other sources of energy for propulsion to either follow the current AMC & GM or develop alternative means of compliance (AltMoC) that comply with the safety objectives of the IRs.

2.3.2.2 Overview of changes to CAT operations with aeroplanes

Annex I (Definitions for terms used in Annexes II to VIII) to the Air OPS Regulation

'Alternate aerodrome' (new)

The definition follows the general structure of the ICAO definition of an 'alternate aerodrome'. The 'adequate aerodrome' definition is maintained as it is a well-understood concept by European pilots and flight operations officers (FOOs). In addition, the ETOPS and extended diversion time operations (EDTOs) documentation, once incorporated into the rules through a different rulemaking task (RMT.0392), will also refer to 'adequate aerodromes'.

'Current fuel/energy scheme' (new)

This new definition introduces a concept mostly used when operators wish to shift from one approved fuel scheme to another. GM1 CAT.OP.MPA.180 explains the concept, which should be mostly used in the context of individual fuel schemes or basic fuel schemes with variations.

'Flight following'; 'flight monitoring'; 'flight watch' (new)

These definitions were taken from ICAO Doc 9976. Although included in a GM to Definitions in NPA 2016-06 (A), RG RMT.0573 revisited the relevance and use of these concepts and moved them to Definitions as they are largely used in the IRs. The definition of 'flight following' is slightly broadened to include alternate aerodromes whereas the ICAO definition covers only the destination aerodrome. These definitions complete the introduction of the operational control concept and they are included in a new set of rules. These rules require operators that apply a basic fuel scheme with variations or an individual fuel scheme to use these tools to maintain constant communication between the operations control centre (OCC) on the ground and the operating flight crew.

'Flight time' (new)

This new definition is based on ICAO Annex 1, Part I and Annex 6, Part III. The purpose of introducing this definition into Definitions is to make it applicable to all possible scenarios in the Air OPS Regulation except for flight time limitations as Subpart FTL of Part-ORO has its own definition of flight time (ORO.FTL.105). Therefore, a definition of flight time for the rest of the Air OPS Regulation was needed to avoid confusion with the ORO.FTL definition of flight time. The new definition includes taxi and is largely harmonised with the definition used for the purpose of the minimum equipment list (MEL).

'Fuel/energy en route alternate (fuel ERA) aerodrome' (new)

A different definition of 'fuel ERA aerodrome' is proposed to replace the current one. Additional fuel rules were introduced into the definition of 'fuel ERA aerodrome' to limit the need for increased planning minima at the normal ERA aerodrome. With the new rules, the weather minima are only required for the fuel ERA aerodrome, and all other ERA aerodromes have to meet only the requirements for an adequate aerodrome.

'Safe landing' (new)

The term 'safe landing' is currently used in European regulations and in ICAO documentation. This term is now used more broadly, particularly in some of the most sensitive requirements, such as those related to FRF. Therefore, it was necessary to create a definition even though ICAO Annex 6, Part I does not include one. The European definition in this Opinion is, to a considerable extent, harmonised with the ICAO understanding of the term; however, it considers the fuel quantity, which ICAO does not.

GM27 Annex I 'Definitions FUEL ERA AERODROME' (new)

This new GM exemplifies the cases where a fuel ERA aerodrome could be used:

— 'fuel ERA aerodrome critical scenario';

— 'fuel ERA aerodrome 3 %' (contingency fuel in the context of a basic fuel scheme with variations); and

— 'fuel ERA aerodrome point of no return (PNR)' to determine the PNR in the context of isolated aerodromes.

GM28 Annex I 'Definitions FLIGHT MONITORING AND FLIGHT WATCH — RELEVANT SAFETY INFORMATION' (new)

This new GM provides a list of elements that can affect flight safety and are also considered important for the communication between flight operations officers (FOOs) and operating flight crew.

'Relevant safety information' is a term used in the definition of 'flight monitoring'.

As flight monitoring is a capability required by operators that use a basic fuel scheme with variations or an individual fuel scheme, such operators have to ensure that they have communication capabilities to exchange timely information between the operations control centre (OCC) on the ground and the in-flight operating flight crew.

It is likely that the examples provided in this GM may not 100 % fit all operators. Therefore, they may decide to eliminate the non-applicable elements, whereas other operators may decide to enhance this list with elements they consider relevant for the specificity of their fuel scheme.

This GM is harmonised with ICAO Doc 9976 and is similar to the Transport Canada Civil Aviation (TCCA) provisions for flight following/flight watch as well as to the Federal Aviation Administration (FAA) provisions[9]. The term used in the FAA Code of Federal Regulations (CFR) 121.628 is 'inoperable instruments or equipment' whereas this GM uses 'aircraft technical failure' (new point (a)), which is also applicable to in-flight fuel management. The wording takes into account a possible equipment/system failure, which increases the likelihood of the OCC supporting the flight crew in

[9] See FAA CFR 2012, Title 14, Vol 3, Part 121, Subpart U, as well as Section 121.535 'Responsibility for operational control'.

dealing with such a technical failure. As automatic live data communication becomes more and more current, this task could be accomplished with no major difficulties.

GM29 Annex I 'Definitions FUEL/ENERGY' (new)

This GM explains the reason for replacing the term 'fuel' with 'fuel/energy' in the Air OPS IRs, where appropriate. The change allows new technologies for aircraft propulsion that are based on other sources or types of energy than hydrocarbon-based fuel to fit in the Air OPS IRs for the operation of such aircraft.

Annex II (Part-ARO 'AUTHORITY REQUIREMENTS FOR AIR OPERATIONS') to the Air OPS Regulation

Point ARO.OPS.225 'Approval of fuel schemes' (amended)

This IR is the current point ARO.OPS.225 'Approval of operations to an isolated aerodrome', but it is significantly amended. Its title is also changed to reflect its content.

Point (b)

This point is to be read in conjunction with point ARO.GEN.300, especially points (a) and (b), as well as AMC1 ARO.GEN.300(a);(b);(c).

Point (c)(3)

The word 'verify' highlights the relevance of AMC2 ARO.GEN.300(a);(b);(c) 'Evaluation of operational safety risk assessment in applying an individual fuel scheme'. A robust and solid operational safety risk assessment that supports the application of the aforementioned individual fuel scheme is necessary.

Furthermore, carrying out this safety risk assessment should trigger operators to follow:

(a) point ORO.GEN.200 (a)(3) 'Management system';

(b) AMC1 ORO.GEN.200(a)(3) 'Management system, COMPLEX OPERATORS — SAFETY RISK MANAGEMENT'; and

(c) GM3 ORO.GEN.200(a)(3) 'Management system, SAFETY RISK ASSESSMENT — RISK REGISTER'.

Point (d)

This point on the approval of isolated aerodromes is amended to create a link with the fuel variation in AMC7 CAT.OP.MPA.182, which requires a specific fuel consumption programme. Consequently, the approval of isolated aerodromes must be specific to aircraft type in an operator's fleet.

Point (e)

Fuel is a safety-critical element, and fuel-related provisions depend on technology.

EASA has the required expertise and experience, which is acquired during the initial certification process for new electric-propulsion, hybrid-propulsion, and other-types-of-propulsion aircraft, to advise and support the competent authorities when approving alternative means of compliance (AltMoC) to fuel scheme requirements for such aircraft. The intent of this requirement is to provide information and advice to competent authorities during the evaluation of their AltMoC and not to substitute the competent authorities or dictate to them the result of such evaluation.

AMC1 ARO.OPS.225 'Approval of fuel/energy schemes OVERSIGHT — VERIFICATION OF COMPLIANCE OF FUEL SCHEMES FOR CAT OPERATIONS WITH AEROPLANES' (new)

To ensure a fully functional system for supporting the individual fuel scheme, it is of utmost importance that all competent-authority personnel involved are properly trained. For that reason, point (c)(8) of AMC1 ARO.OPS.225 is proposed. However, formal training is normally not enough, and complex systems require informal learning/informal knowledge. This informal knowledge is normally acquired through personal experience, outside of the formal learning environment. Therefore, experience of the personnel is necessary to ensure a functional system, especially as regards flight crew. The experience of the personnel and flight crew is an important factor that the competent authority should consider when assessing the extent of the deviation that is proposed by the operator.

For the same purpose, the new AMC2 ARO.OPS.225(c) 'Approval of fuel/energy schemes APPROVAL OF INDIVIDUAL FUEL SCHEMES — APPLICATION OF INDIVIDUAL FUEL SCHEMES — GUIDANCE TO STAFF' additionally recommends the verification of the crew's experience in the system that is used by the operator.

Note 1: in the context of informal learning/informal knowledge, negative training was also taken into consideration. Point ORO.GEN.200 'Management system', which includes internal occurrence-reporting schemes and compliance monitoring, should prevent the possibility of negative training.

Note 2: nothing prevents the competent authority from providing an individual fuel scheme, subject to an implementation plan with which operators will comply internally. This could prevent a potential administrative burden (e.g. several approval requests over a period of 2-3 years when the fuel schemes are likely to increase in diversity), allowing at the same time the operator's personnel to acquire more experience in a progressive manner.

Point (e)

Point ARO.GEN.300 (a)(2) requires that the competent authority verifies the continued compliance of the operators with the applicable requirement(s). This requirement is general and must encompass all fuel schemes. AMC1 ARO.OPS.225 addresses the need to establish a specific process to oversee individual fuel schemes, which will ensure continued compliance.

GM1 ARO.OPS.225 'Approval of fuel/energy schemes OPERATIONS TO AN ISOLATED AERODROME — GENERAL' (amended)

This GM is amended and its title changed from 'Approval of operations to an isolated aerodrome GENERAL' to 'Approval of fuel/energy schemes OPERATIONS TO AN ISOLATED AERODROME — GENERAL'.

The amended GM explains that when the competent authority grants an approval for an isolated aerodrome, that approval is issued for each isolated aerodrome and for a specific type of aircraft.

GM2 ARO.OPS.225 'Approval of fuel/energy schemes ASSESSMENT AND OVERSIGHT OF POLICIES ASSOCIATED WITH FUEL SCHEMES' (new)

This new GM highlights that the assessment and oversight of an operator's fuel scheme is not carried out for each fuel policy in isolation from the other two (fuel planning and in-flight replanning, selection of aerodromes and in-flight fuel management). The competent authority always has to consider them

as a whole. The fuel policies have to be included in the operator's safety management system (SMS) and complete it.

AMC1 ARO.OPS.225(c) 'Approval of fuel/energy schemes APPROVAL OF INDIVIDUAL FUEL SCHEMES — QUALIFICATION OF STAFF' (new)

This new AMC highlights that the competent-authority inspectors should have appropriate experience and knowledge to carry out a proper assessment of an individual fuel scheme.

To support the smooth implementation of the related requirement, EASA is planning a series of safety promotion activities that include workshops, consultation sessions with competent authorities, as well as the development of a checklist to be used by inspectors in the assessment of individual fuel schemes.

AMC2 ARO.OPS.225(c) 'Approval of fuel/energy schemes APPROVAL OF INDIVIDUAL FUEL SCHEMES APPLICATION OF INDIVIDUAL FUEL SCHEMES — GUIDANCE TO STAFF' (new)

This new AMC provides the inspectors with a list of elements that the operator's individual fuel scheme should cover.

Although it was initially published as GM in NPA 2016-06 (A) (see GM1 ARO.OPS.225), following further discussions and consultation sessions, EASA decided to elevate this GM to AMC level.

The 2-year period is selected as it matches the interval for data collection for the statistical contingency fuel.

See also the explanation to AMC1 ARO.OPS.225 above.

GM1 ARO.OPS.225(c) 'Approval of fuel/energy schemes INDIVIDUAL FUEL SCHEMES — RESOLUTION OF SIGNIFICANT FINDINGS' (new)

This new GM clarifies what should be understood by 'significant findings' in the relevant areas, as stated in point (c)(4) of AMC1 ARO.OPS.225. When operators apply for the approval of an individual fuel scheme, they may have some open findings in the areas that support the implementation of such schemes. Those open findings must be fully dealt with before the approval is granted.

Part-ORO 'ORGANISATION REQUIREMENTS FOR AIR OPERATIONS'

GM1 ORO.GEN.110(c) 'Operator responsibilities OPERATIONAL CONTROL' (amended)

In point (b) of this GM, the ICAO reference is no longer valid and therefore deleted and replaced with an updated one. Moreover, a new related AMC is introduced.

AMC1 ORO.GEN.110(c)&(e) 'Operator responsibilities' (new)

This new AMC includes the following:

— training programme for flight operations officers (FOOs) for flight monitoring or flight watch;

— initial training;

— operator-specific training;

— recurrent training; and

— retaining of knowledge, skills, and qualifications for FOOs/ground instructors.

Several stakeholder commented that EASA should include a training programme for FOOs in the rules and 'undertake a rulemaking task for the initiation of a flight dispatch system in Europe, similar or identical to that which operates in the USA' (see CRD 2016-06 (A)).

The EASA system does not mandate a European licence for FOOs as they do not share the responsibility of operational control of a flight with the commander.

Point ORO.GEN.110 (c) includes the requirement that the operator '[…] shall establish and maintain a system for exercising operational control over any flight operated under the terms of its certificate […]'. Furthermore, point ORO.GEN.110 (e) contains a generic requirement on personnel proficiency and instruction: '[…] all personnel assigned to, or indirectly involved in, ground and flight operations, are properly instructed, have demonstrated their abilities in their particular duties and are aware of their responsibilities and the relationship of such duties to the operation as a whole.'

EASA acknowledges that a training programme for FOOs would be necessary especially in the context of the new fuel rules, when the operator's capabilities require adequate preparation of the personnel involved in the operational control of flights.

Consequently, a new AMC is inserted into the Air OPS rules with a training programme for those FOOs whose tasks and responsibilities include flight monitoring and flight watch for the purpose of fuel planning and management. This new AMC does not imply that the FOOs will share responsibility for the flight's operational control with the commander, nor that a licence for this position is required.

This is the first step in addressing the training requirements for FOOs in the Air Ops rules in a wider context: training requirements for personnel involved in the activities of an operator's OCC. As this is a more complex task, which requires input from experts in the domain of flight operations that are performed in an operator control centre (OCC), it will be addressed in a separate RMT (RMT.0392).

The training programme is based on the provisions of ICAO Annex I. Additional training elements are included, based on examples of good practice by operators that already have a training programme for FOOs. These additional elements are the following:

— the effects of meteorological conditions on radio reception on the aircraft used by the operator;

— all-weather operations;

— navigation and radio equipment on the aircraft used by the operator;

— procedures for operations beyond 60 minutes including, if applicable, EDTOs;

— de-icing/anti-icing; and

— special aerodromes.

The AMC explains that general (initial) training should be followed by training on specific procedures of the operator (as per the model of type rating training that is followed by operator conversion training).

An interval for the recurrent training is also included, as well as minimum conditions for ground instructors for the retaining of knowledge, skills, and qualifications.

AMC2 ORO.GEN.110(f) 'Operator responsibilities INSTRUCTIONS AND AWARENESS OF THE RESPONSIBILITIES OF PERSONNEL — BRIEFING OF FLIGHT OPERATIONS OFFICERS/FLIGHT DISPATCHERS BEFORE ASSUMING DUTIES' (new)

This new AMC is introduced to ensure that flight operations officers (FOOs)/flight dispatchers (FDs) receive briefing before performing their duty. This way, they are able to provide updated information to the operating flight crews.

GM2 ORO.GEN.110(f) 'Operator responsibilities ELEMENTS OF THE BRIEFING OF FLIGHT OPERATIONS OFFICERS/FLIGHT DISPATCHERS BEFORE ASSUMING DUTIES' (new)

This new GM contains examples of relevant safety information on which an FOO/FD should be briefed before performing duty.

Part-CAT 'COMMERCIAL AIR TRANSPORT OPERATIONS'

Point CAT.OP.MPA.106 'Use of isolated aerodromes — aeroplanes' (deleted)

Based on the approach to integrate all requirements related to fuel schemes in the series of CAT.OP.MPA.180 and CAT.OP.MPA.190 points, the content of this IR is amended and moved to the new point CAT.OP.MPA.182 (d) on aerodrome selection policy, and to the new AMC2 CAT.OP.MPA.182.

GM1 CAT.OP.MPA.107 'Adequate aerodrome VERIFICATION OF WEATHER CONDITIONS' (new content)

The current content of GM1 CAT.OP.MPA.107 'Adequate aerodrome RESCUE AND FIREFIGHTING SERVICES (RFFS)' is deleted and replaced by the new one to clarify the difference between 'adequate aerodrome' and 'weather-permissible aerodrome'. The two concepts are complementary:

— for 'adequate aerodrome', see point CAT.OP.MPA.107; and

— for 'weather-permissible aerodrome', which means adequate plus weather-permissible aerodrome, see Definitions: *'weather-permissible aerodrome' means an adequate aerodrome where, for the anticipated time of use, weather reports, or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the required aerodrome operating minima, and the runway surface condition reports indicate that a safe landing will be possible*.

Point CAT.OP.MPA.150 'Fuel policy' (deleted)

The content of the current point CAT.OP.MPA.150 that is applicable to aeroplanes is amended and partly moved to the new point CAT.OP.MPA.181. The parts that are applicable to helicopters are amended and moved to the new point CAT.OP.MPA.191.

AMC1 CAT.OP.MPA.150(b) 'Fuel policy PLANNING CRITERIA — AEROPLANES' (deleted)

The content of this AMC is moved to the following:

— new AMC1 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME — PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES';

— new AMC2 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME — PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS B AND C AEROPLANES'; and

— partly to the new point CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes'.

AMC2 CAT.OP.MPA.150(b) 'Fuel policy — LOCATION OF FUEL EN-ROUTE ALTERNATE (FUEL ERA) AERODROME' (deleted)

Its content is moved to the new AMC8 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING SYSTEM'.

AMC3 CAT.OP.MPA.150(b) 'Fuel policy PLANNING CRITERIA — HELICOPTERS' (deleted)

Its content is amended and moved to the new AMC1 CAT.OP.MPA.191(b)&(c) 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — helicopters PLANNING CRITERIA'.

GM1 CAT.OP.MPA.150(b) 'Fuel policy CONTINGENCY FUEL STATISTICAL METHOD — AEROPLANES' (deleted)

Its content is moved to the new GM2 CAT.OP.MPA.181 'Fuel/energy scheme — Fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME WITH VARIATIONS – STATISTICAL CONTIGENCY FUEL METHOD'.

GM1 CAT.OP.MPA.150(c)(3)(i) 'Fuel policy CONTINGENCY FUEL' (deleted)

Its content is amended and moved to the new point (g) of GM1 CAT.OP.MPA.181 'BASIC FUEL SCHEME — UNFORESEEN FACTORS' (point CAT.OP.MPA.181 (c)(3)).

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

Its content is amended and moved to the new point (h) of GM1 CAT.OP.MPA.181 'BASIC FUEL SCHEME — DESTINATION ALTERNATE AERODROME' (see point CAT.OP.MPA.181 (c)(4)).

Point CAT.OP.MPA.151 'Fuel policy — alleviations' (deleted)

Its content is partially moved to the new CAT.OP.MPA.191 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — helicopters' under paragraph (e), and partially to the new AMC2 CAT.OP.MPA.181 'Fuel/energy schemes — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME —PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS B AND C AEROPLANES'.

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

In response to a comment received on NPA 2016-06 (A), new paragraphs are added to this AMC to cover the computerised flight planning system for operators that use a basic fuel scheme with variations or an individual fuel scheme.

These elements are based on ICAO Doc 9976, Chapter 5, Appendix 7, 1.12, except for the element regarding the authenticity of the software that is discarded (considered no longer necessary), after consultation with service providers, as technological improvements make it increasingly difficult to use an unauthorised programme.

This AMC serves the following purposes:

— ensures that the functionality of the computerised tool is available to the relevant users;

— mitigates the risk of erroneous behaviour of the computerised flight planning system after an upgrade or major update of the tool by testing it before its further use; furthermore, the new training conditions for FOOs/FDs in AMC1 ORO.GEN.110(c)&(e) provide also for adequate training conditions for such updates; and

— links the condition that operators should have a computerised flight planning system to the other rules that contain the same condition, which is related to more than one fuel scheme.

Point CAT.OP.MPA.177 'Submission of the ATS flight plan' (new)

The current CAT.OP.MPA.190 'Submission of the ATS flight plan' is renumbered as CAT.OP.MPA.177. The renumbering accommodates the restructuring of the fuel rules: points CAT.OP.MPA.180 to 189 for aeroplane CAT operations and points CAT.OP.MPA.190 to 199 for helicopter CAT operations, respectively.

AMC1 CAT.OP.MPA.177 'Submission of the ATS flight plan FLIGHTS WITHOUT AN ATS FLIGHT PLAN' (new)

The current AMC1 CAT.OP.MPA.190 'Submission of the ATS flight plan FLIGHTS WITHOUT ATS FLIGHT PLAN' is renumbered as AMC1 CAT.OP.MPA.177.

Point CAT.OP.MPA.180 'Fuel/energy scheme — aeroplanes' (new)

The title of the current CAT.OP.MPA.180 is amended from 'Selection of aerodromes — aeroplanes' to 'Fuel/energy scheme — aeroplanes'. Its current content is moved to the new AMC1 CAT.OP.MPA.182 on aerodrome selection policy for aeroplanes and new content is created, which introduces and explains the concept of 'fuel scheme'. This IR links fuel/energy planning with the selection of aerodromes and in-flight fuel/energy management.

It also introduces the concept of individual fuel schemes in point (d). The individual fuel schemes are intended for those operators that demonstrate certain advanced capabilities, as defined in point (d)(2). These capabilities are further developed in the new AMC1 CAT.OP.MPA.180. Operators must also demonstrate an equivalent level of safety, as described in points (d)(1) and (d)(3), as well as in AMC1 CAT.OP.MPA.180 and related GM.

The concept of individual fuel schemes follows a similar approach to that of the individual flight time specifications schemes, which are already introduced by ORO.FTL in the Air OPS Regulation. The differences are that instead of using CSs (non-binding standards for establishing the certification basis), the individual fuel schemes use only AMC & GM, and instead of being ultimately approved by EASA, the individual fuel schemes are entirely approved and controlled by the competent authorities at national level.

The idea of baseline safety performance was originally proposed in ICAO Doc 9976 (refer to Sections 5.2.5 and 5.4.8 'Establishing baseline safety performance', and especially 5.4.81, 5.4.82, and 5.4.83 for more information).

When operators obtain the approval to use AMC1 CAT.OP.MPA.180 'Fuel/energy scheme — aeroplanes INDIVIDUAL FUEL SCHEME' as a means of compliance, and wish to apply for a new individual fuel scheme, a new baseline safety performance should be established using the current individual fuel scheme, not the baseline established years before. Therefore, when moving to a more performance-based fuel scheme, operators must consider the safety performance of the current individual fuel scheme. The reason is that in the current fuel scheme, some of the selected safety

performance indicators (SPIs) were most likely meaningful, but in the proposed new fuel scheme, they may lose their significance. Hence, a new baseline safety performance should be established. Moreover, the targets achieved in the current individual fuel scheme that was approved by the competent authority may not be sufficient for the newly proposed individual fuel scheme. Therefore, a better baseline safety performance must be established before having the new individual fuel scheme approved (point CAT.OP.MPA.180 (d)(1)).

The term used in this IR is 'equivalent level of safety', which was preferred to 'acceptable level of safety, as it is the correct term to be used when establishing a baseline safety performance. In addition, the Basic Regulation uses 'equivalent level of safety', while 'acceptable level of safety' is not used (point CAT.OP.MPA.180 (d)(3)).

The term 'basic' is used for the fuel scheme to allow the term 'baseline' to be used for safety performance in accordance with ICAO Doc 9976.

AMC1 CAT.OP.MPA.180 'Fuel/energy scheme — aeroplanes INDIVIDUAL FUEL SCHEME' (new)

This AMC is based on ICAO Doc 9976. It sets out the conditions for a more performance-based fuel scheme, which operators may apply if they demonstrate that they have implemented a mature management system and have robust capabilities to sustain a more complex fuel scheme. These operators are required, among others, to have in place more stringent mitigation measures to compensate for the carriage of less fuel, as well as to perform a more comprehensive statistical analysis of fuel data.

The AMC intends to provide for accuracy of the preflight fuel calculation, taking into account meteorological conditions, wind prediction, etc. This is very important for the safety of operation under individual fuel schemes. For that reason, the condition of having a suitable computerised flight planning system was inserted.

As fuel reserves are limited, it is very important that an individual fuel scheme is able to reduce as much as possible the difference between the trip fuel that is calculated during the preflight preparation and the actual trip fuel that is consumed during the flight. Accurate navigation that minimises the possibility of deviation from the initial planned flight track is then necessary. This is why the AMC sets out the conditions for performance-based navigation (PBN) capabilities as EASA expects an extensive use of area navigation (RNAV) and required navigation performance (RNP) applications in the future.

The term 'operational control system' was introduced to mirror the requirements of point ORO.GEN.110 (c), rather than using the ICAO terminology. Adequate meteorological information is very important for individual fuel schemes (refer also to ICAO Doc 9976). As the related requirement in point ORO.GEN.110 (c) is laid down under the operational control system, and flight crew is part of that system, only the flight crew may fulfil this particular requirement. Nevertheless, final responsibility for deciding lies with the competent authority, depending on the area of operation, workload of the crew, etc.

This AMC allows for some flexibility as not all official meteorological offices provide qualitative and reliable terminal aerodrome forecasts (TAFs) and/or meteorological terminal aviation routine weather reports (METARs). Operators may subcontract with external services to have a more reliable picture of the meteorological information, including the improvement of such information.

Operators should base the demonstration of effectiveness of the internal processes that support the implementation of the individual fuel scheme, as referred to in point (d)(3) of this AMC, on the requirements of point ARO.OPS.225 and on the related GM. See also ICAO DOC 9976, Chapter 5, Appendix 7 'A performance-based approach job-aid for an approving authority'.

Point (a)(1)(ii) 'sufficient data to support the intended deviation'

The amount of data that is sufficient to support the individual fuel scheme is an important matter on which operators and their competent authorities must agree.

If the extension of the deviation is simple, then a number of 100 flights, for example, may be sufficient. Simple deviation is a deviation from 5 % to 4 % contingency fuel in a basic fuel scheme in a safe operational area (e.g. the European Union), or a deviation from 2 % to 3 % in a basic fuel scheme with variations. Another example of a simple deviation might be to allow a no-alternate aerodrome policy for flights longer than 6 hours (e.g. 15 hours) in an individual fuel scheme, as required by the amended point CAT.OP.MPA.182. For such deviations, only one factor may be affected. Therefore, an example of 100 flights and 2 years of operation may be statistically relevant.

However, when several factors are involved in a deviation, then the number of 100 flights is no longer relevant. For example, a reduction of contingency fuel to 2 %, combined with statistical trip fuel and a deviation in the aerodrome selection, is considered a significant deviation from a fuel scheme. In this case, operators would have to increase the number of flights from which to collect relevant data to develop a solid safety risk assessment that can provide for an equivalent level of safety to that provided by their current fuel scheme.

Point (e)(6)(i) 'flight monitoring or flight watch'

To use an individual fuel scheme, operators must have flight monitoring or flight watch capabilities. The definitions of 'flight monitoring' and 'flight watch' in Definitions and the related AMC & GM on safety-related information include mitigation measures to ensure an equivalent level of safety to that provided by the basic fuel scheme.

In an individual fuel scheme, operators may develop a fuel planning policy where the fuel to the destination alternate aerodrome is reduced by cutting down on the fuel for the go-around. In this context, pilots have less time to decide, and they would be informed of the conditions in the destination alternate aerodrome via the 'safety-related information' provided by the monitoring and/or flight watch capabilities. In the basic fuel planning policy, the commanders would have used the latest part of the go-around manoeuvre (approaching the holding pattern) to check if the conditions in the destination alternate allow for diversion.

GM1 CAT.OP.MPA.180 'Fuel/energy scheme — aeroplanes FUEL SCHEMES' (new)

This GM clarifies which AMC an operator should use depending on the fuel scheme the operator applies.

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

Point (b) is linked to the concept of 'current fuel scheme'. It indicates that shifting from one approved fuel scheme to another requires that the operator collects historical data to sustain the selected safety performance indicators. When an operator wishes to shift to an individual fuel scheme, the new fuel scheme will have to be approved by the competent authority. The competent authority will also assess

the new fuel scheme in comparison with the current (approved) fuel scheme that the operators use at that moment.

The note in point (c) '[…] for certain non-data-based monitoring SPIs, alert and target levels may be qualitative in nature' was introduced in the GM to acknowledge that some SPIs can be qualitative in nature and that the combination of data-driven SPIs and qualitative SPIs would be beneficial. ICAO Doc 9976, Section 5.2.8 also supports this statement.

GM3 CAT.OP.MPA.180 'Fuel/energy scheme — aeroplanes INDIVIDUAL FUEL SCHEMES — OPERATOR CAPABILITIES — COMMUNICATION SYSTEMS' (new)

This GM clarifies the necessity to have two independent communication systems on board. Those two systems will mitigate the risk of losing one of the communication channels when constant communication of safety-related information between the operations control centre (OCC) on the ground and operating flight crew should be possible (also recommended by ICAO Doc 9976, Chapter 5, Appendix 7).

Point CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes' (amended)

The title of this IR is changed from 'Selection of aerodromes and operating sites — helicopters' to 'Fuel/energy scheme – Fuel/energy planning and in-flight replanning policy – aeroplanes'. Its content stems from the current point CAT.OP.MPA.150 and partly AMC1 CAT.OP.MPA.150(b).

The current content of the IR is moved to the new point CAT.OP.MPA.192 and amended.

Point (b)(2) 'operating conditions'

New elements, compared to the version of the IR published in NPA 2016-16 (A), are added in point (b)(2). EASA made this change in response to several comments requesting that this IR should cover also the effects of deferred maintenance and configuration deviations, anticipated departure and arrival routes and runways, as well as anticipated delays.

'expected' and 'anticipated' in point (b)

ICAO Annex 6 uses the term 'expected' in relation to routing, departures, arrivals, etc. and the term 'anticipated' in relation to weather, mass and balance, delays, etc.

In the Air OPS Regulation, the terms 'expected' and 'anticipated' are used as follows:

— the term 'expected' is used when the event that is indicated by the subject ('routing', 'departure', etc.) is more likely to happen, normally because there is a system supporting it (e.g. air traffic management (ATM) provides support to operators to achieve their intended routing); and

— the term 'anticipated' is used when the event that is indicated by the subject ('delay', 'mass & balance', etc.) is less likely to happen because it is unpredictable — in the case of mass & balance, for instance, one cannot be sure that the passenger will be present at the gate for boarding.

Point (c)(1) 'taxi fuel/energy'

The calculation of taxi fuel follows a three-layer approach:

— the first layer is the IR that states the safety objective;

— the second layer, AMC1 CAT.OP.MPA.181, provides further details to calculate the taxi fuel, which should take into account the fuel for the auxiliary power unit (APU) and the local conditions; and

— the third layer, point (a) of GM1 CAT.OP.MPA.181, provides more details on the local conditions in general.

Point (c)(4) 'destination alternate fuel/energy'

'destination' before 'alternate fuel/energy' was added to fully harmonise this IR with the terminology used in ICAO Annex 6, Part I, SARP 4.3.6.3(d) 'destination alternate fuel'.

Point (c)(4)(ii) 'no destination alternate aerodrome'

The additional 15-minute fuel is based on the current AMC1 CAT.OP.MPA.150. To better harmonise this IR with ICAO Annex 6, Part I, the current AMC text is elevated to IR level. The safety objective of this requirement is achieved through the provision of additional fuel to compensate for the lack of a destination alternate aerodrome.

The introduction of the wording 'safe landing' in this point provides for the safety objective of the 15-minute fuel because when a longer holding time is expected, then fuel for more than 15 minutes is required to ensure a safe landing. Removing the term 'safe landing' from this point would no longer ensure that the aeroplane can make a safe landing (above the remaining FRF).

Point (c)(5) 'final reserve fuel/energy'

To fully harmonise the IR with the terminology that is used in ICAO Annex 6, Part I, the term 'reserve fuel', which is part of the current text of CAT.OP.MPA.150, is deleted with regard to CAT aeroplane operations as ICAO does not used it as such (see ICAO SARP 4.3.6.3.).

However, the concept of 'final reserve fuel (FRF)' is extensively used both in ICAO and EU rules and, therefore, is maintained. In addition, the Air OPS Regulation uses two very similar terms: 'reserve fuel' and 'final reserve fuel', which may create confusion.

Note: a consistency check of the term 'reserve fuel' was performed throughout the Air OPS Regulation to ensure that the concept is not used for CAT aeroplane operations.

Point (c)(6) 'additional fuel/energy'

Response to comments Nos 120 and 157 on NPA 2016-06 (A) that stated: 'safe landing is defined with final reserve fuel but the critical scenario only requires 15 minutes':

Normally, the additional fuel/energy is used when the aircraft has a light weight.

If there is an emergency, the commander should have more than 15 minutes. That is why it is required to ensure a safe landing (30 minutes) plus 15 minutes (AMC1 CAT.OP.MPA.181). The same approach as in the current point CAT.OP.MPA.150 (and AMC1 CAT.OP.MPA.150) is followed: safe landing (30 minutes) plus 15 minutes.

'Fuel ERA aerodrome' replaces 'adequate aerodrome' to increase the safety of a flight with an engine failure or loss of pressurisation.

Points (c)(7) 'extra fuel/energy' and (c)(8) 'discretionary fuel/energy'

Extra fuel/energy in the current IRs is left at the commander's discretion. As this created confusion, 'fuel/energy at the commander's discretion' should acquire a clearer status. Therefore, extra fuel/energy is further explained to take into account the anticipated delays or specific operational constraints.

With regard to the extra fuel/energy, the IR uses the formulation 'to take into account anticipated delays or specific operational constraints', while AMC1 CAT.OP.MPA.181 states 'include anticipated delays or specific operational constraints that can be predicted'. The reason for this difference is that the IR defines the safety objective whereas the AMC provides the means of implementation; this way, EASA clarifies that extra fuel/energy may be zero when there are no anticipated delays or specific operational constraints.

A new type of fuel/energy is introduced: 'discretionary fuel/energy' is the fuel at the sole discretion of the commander. The discretionary fuel/energy is not mandatory if the commander considers it unnecessary; at the same time, the commander ultimately decides what amount of discretionary fuel/energy should be taken. This fuel/energy category implies a safety culture element that should remain outside and above the rule text. However, the power of the discretionary fuel/energy is fully ensured by its presence in point CAT.OP.MPA.181 (c)(8).

For discretionary fuel, no justification is required. Conversely, extra fuel is normally provided by the operator's personnel (e.g. OCC, FOO/FD, commander, etc.) with a specific justification (e.g. the expected holding time at destination).

Point (d) 'in-flight replanning'

In-flight replanning was originally part of point CAT.OP.MPA.150 'Fuel policy'. Due to the renumbering of the IRs, the most logical place for in-flight replanning would be point CAT.OP.MPA.181 (d). However, RG RMT.0573 discussed whether in-flight replanning could be better placed as an additional option within in-flight fuel management. It was eventually decided to keep it in the flight planning IR to maintain:

(a) the simplicity of the IRs for in-flight fuel management; and

(b) the approach that was agreed at the time of the European Union Air Operations Regulation (EU-OPS), which was incorporated into the Air OPS Regulation.

<u>AMC1 CAT.OP.MPA.181 'Fuel/energy schemes — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME — PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES' (new)</u>

This AMC partially includes the current text of AMC1 CAT.OP.MPA.150(b) 'Planning criteria — aeroplanes' and of point CAT.OP.MPA.151 'Fuel policy — alleviations'.

'expected arrival routing' is used for consistency with the 'expected departure routing' in point CAT.OP.MPA.181(b).

Point (d)(1)(i) 'fuel for go around'

RG RMT.0573 discussed the possibility to provide more flexibility with regard to the fuel for go-around (the FAA provides some flexibility in this sense). This option was discarded, as it would allow operators to use individual fuel schemes. RG RMT.0573 analysed the issue and agreed the following: for a basic

fuel scheme, the fuel for a full go-around must be planned to ensure that the pilot has enough time at the last stages of the go around (when it is safe, after the more demanding initial go-around manoeuvre). This way the pilot is able to gather the necessary information about destination, destination alternate aerodrome and/or other possible aerodromes, and make the right decision to divert. While in the individual fuel schemes, plenty of mitigation measures are required to ensure that the level of safety is equivalent or increased, in the basic fuel schemes, such mitigation does not exist. Hence, solely the flight crew makes all time-critical decisions. Therefore, full go-around fuel must be provided, as the pilot is likely to make the decision to divert only in the last stage of the go-around.

The text of point (c) is based on ICAO Annex 6, Part 1, SARP 4.3.6.3.

Point (g) 'extra fuel'

As the IR refers to 'extra fuel/energy to take into account anticipated delays or specific operational constraints', RG RMT.0573 discussed one possible interpretation of the IR according to which extra fuel/energy must be taken in all situations. To avoid this misinterpretation, the formulation of the AMC is different from that of the IR, thus clarifying that extra fuel/energy is not mandatory in all cases, but only if anticipated delays or specific operational constraints can be predicted. See also the explanation to points CAT.OP.MPA.181 (c)(7) and (c)(8) on extra and discretionary fuel/energy, provided above.

AMC2 CAT.OP.MPA.181 'Fuel/energy schemes — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME —PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS B AND C AEROPLANES

This AMC incorporates parts of the current AMC1 CAT.OP.MPA.150(b) 'Fuel police PLANNING CRITERIA — AEROPLANES' and the current point CAT.OP.MPA.151 'Fuel policy — alleviations'.

RG RMT.0573 analysed whether this rule should be included in an IR or AMC. As IRs are drafted following a performance-based approach, the differences between performance class B aeroplanes and performance class A aeroplanes can be addressed at AMC level. Therefore, performance class B aeroplanes meet the same safety objective stated in the IR for performance class A aeroplanes, but the specifications are different as certain operational factors and fuel calculations for performance class B aeroplanes can be simplified.

AMC3 CAT.OP.MPA.181. Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME — PREFLIGHT CALCULATION OF USABLE FUEL FOR ELA2 AEROPLANES

This new AMC was created for ELA2 aeroplanes that depart from and arrive at the same aerodrome as performance class A aeroplanes, and that operate under visual flight rules (VFR).

GM1 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME' (new)

The current title of this GM is changed from 'Selection of aerodromes and operating sites — helicopters LANDING FORECAST' to 'Fuel/energy scheme — Fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME' and its content is redrafted.

The current text of GM1 CAT.OP.MPA.181 is moved to the new GM1 CAT.OP.MPA.192(c)&(d) 'Selection of aerodromes and operating sites — helicopters LANDING FORECAST' and amended.

This GM addresses the basic fuel scheme.

TAXI FUEL — LOCAL CONDITIONS

Please see also the explanation of point CAT.OP.MPA.181 (c)(1) above.

Over the years, some EU operators have been continuously using lower-than-required taxi fuel, resulting in the use of contingency fuel during taxi. This behaviour leads to a reduction of safety margins, thus increasing the risk exposure in favour of lowering the operational costs.

To avoid an arbitrary interpretation of the rules by some EU operators, which may lead to a reduction of safety margins, EASA decided to redefine the taxi-fuel category. According to point (a) of AMC1 CAT.OP.MPA.181 'BASIC FUEL SCHEME — PREFLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES', taxi fuel should take into account the local conditions at the aerodrome of departure. The definition of local conditions is based on ICAO Annex 6, SARP 4.3.6.2(b) 'Operating conditions for the planned flight'. RG RMT.0573 agreed that the local conditions should include at least: notice to airmen (NOTAM), meteorological conditions, air traffic services (ATS) procedures (e.g. low visibility procedures (LVP), airport collaborative decision-making (ACDM), etc.), and known delays.

PLANNING OF FLIGHTS

This point of the GM explains that the operator should use the data derived from a fuel consumption monitoring system, if available. It is linked to point CAT.OP.MPA.181 (a)(4). That data should take precedence over the data provided by the aircraft manufacturer, which should be used only in specific cases.

FUEL CONSUMPTION MONITORING SYSTEM

This point of the GM is created according to the guidelines of ICAO Doc 9976. It is related to point CAT.OP.MPA.181 (a)(4).

ANTICIPATED MASSES — LAST-MINUTE CHANGES

Fuel calculations for large jet aircraft are usually made a few hours before departure. However, the final zero fuel weight (ZFW) is established a few minutes before departure.

Knowing that fuel burn depends on the weight of the aircraft, more aircraft weight leads to higher fuel consumption (approximately a 3 % increase in fuel burn per kg per hour).

The potential risk could be a departure with an underestimated fuel quantity based on a lower ZFW than the actual one. Operators can limit this risk by using verification procedures. Industry practice shows that fuel calculation adjustments in the operational flight plan (OFP) are generally carried out by adding data or tables to the operations manual.

According to the data provided by RG RMT.0573, ZFW is generally assessed based on the expected cargo and passenger weight, which is usually overestimated. Statistically, this ZFW gradually decreases and stabilises just before the departure time.

According to AMC3 ORO.MLR.100 'Operations manual — general', operators should establish procedures and responsibilities for the preparation and acceptance of the OFP, which should include verification of fuel quantities.

RG RMT.0573 considered that the current requirements of the Air OPS Regulation are sufficient to cover the verification of ZFW changes. The implementation by the operators of the OFP acceptance procedures may be subject to an assessment by the competent authority during flight preparation audits. However, clear limits beyond which a new OFP should be calculated were not always well defined and visible to the flight crew. The same issue exists for flight dispatching/ground crew, making it very difficult for them to recognise when a new OFP may be required whenever ZFW changes occur. This matter is of utmost importance because when the final ZFW information is received by the crew, the time needed to calculate and receive a new OFP is critical at that stage of flight preparation.

Finally, RG RMT.0573 considered that point (d) of this GM should also cover the need to provide crews with practical tools to update the fuel quantity according to ZFW changes. For that purpose, the following sentence was added: '[…] procedures should include means to revise the fuel quantity […]'.

TRIP FUEL – ARRIVING ROUTING

POINT MERGE PATTERN AND TROMBONE PATTERN

'Point merge' (point (e) of the GM) is a form of holding over destination, which in essence is not different from other forms of holding, i.e. racetrack holding patterns or linear holding (e.g. trombone pattern — point (f) of the GM).

The condition for using contingency fuel in such calculations is the availability of data on the average point merge to be flown; that data is obtained either from internal or external sources (operator and/or ATS unit). From the operator's perspective, such information could come from internal data-collection processes that support statistical contingency fuel (SCF) calculations. From the perspective of an ATS unit that has implemented procedures to support point merge, such information could be provided in the form of regularly published statistics. Those statistics allow for high levels of predictability regarding the sections of linear holding on the point-merge arc that may be flown. In either case, those statistics will allow pilots to determine, in accordance with the expected arrival time, the contingency/discretionary/extra fuel, as applicable, that is needed for safe flight completion. However, ATS units that use point-merge standard terminal arrival routes (STARs) or similar PBN procedures typically publish statistics that show that portion of the point-merge arc that is flown by arriving aircraft during various hourly bands of the day or the week.

In addition, operators that lack the requisite skills, expertise, and knowledge to support SCF calculations or to otherwise predict the likelihood that an entire procedure may be flown may erroneously consider the entire flight plan track until the destination, including potential standard instrument departure (SID)/STAR combinations, when calculating trip fuel and discretionary fuel.

UNFORESEEN FACTORS

Point (g) of this GM is related to point CAT.OP.MPA.181 (c)(3).

ICAO Annex 6, SARP 4.3.6.7, Amendment 38 clarifies the use of contingency fuel during taxi. As per this new provision, the commander should perform a reanalysis and, if applicable, an adjustment of the planned operation. If any delay results in the consumption of the adjusted contingency fuel before take-off, the commander should return to the parking position for refuelling. RG RMT.0573 agreed to

maintain the current EU policy[10] that allows for the use of contingency fuel during taxi if exceptional circumstances result in unexpected ground delays.

ICAO Annex 6, SARP 4.3.6.7, Amendment 38:

'4.3.6.7 The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

Note.— Guidance on procedures for in-flight fuel management including re-analysis, adjustment and/or re-planning considerations when a flight begins to consume contingency fuel before take-off is contained in the Flight Planning and Fuel Management (FPFM) Manual (ICAO DOC 9976).'

DESTINATION ALTERNATE AERODROME

This point of the GM explains the application of point (c)(4) of the related IR: the departure aerodrome can also be selected as the destination alternate aerodrome.

FINAL RESERVE FUEL

This point of the GM is related to point CAT.OP.MPA.181 (c)(5).

ICAO Annex 6, Part I, SARP 4.3.6.4 'Recommendation' states:

'The operator may determine conservative (rounded up) final reserve fuel values for each type and variant of aeroplane used in operations.'

The proposed text of the GM is extracted from ICAO Doc 9976, Section 4.23.4:

'Conformance with this Recommended Practice would require an operator to determine conservative (rounded up) final reserve fuel values for each type and variant of aeroplane used in operations. The intent of this recommendation is two-fold, it provides:

(a) a reference value to compare to pre-flight fuel planning computations and for the purposes of a 'gross error' check;

(b) flight crews with easily referenced and recallable final reserve fuel figures to assist in in-flight fuel monitoring and decision-making activities.'

ANTICIPATED DELAYS

This point of the GM is related to point CAT.OP.MPA.181 (c)(7).

The two ICAO terms, restrictions and ATS procedures, are added as examples to this point of the GM as RG.RMT.0573 considered that they are used in describing anticipated delays.

Another example is added (ATS procedure that may require operators to fly longer routes due to curfew during night time), following a comment on NPA 2016-06 (A).

DISCRETIONARY FUEL

This point of the GM refers to point CAT.OP.MPA.181 (c)(8), and is added to support the objective of the IR: it highlights that discretionary fuel is solely at the commanders' discretion and that the commander decides on the quantity of discretionary fuel to be taken on board. Operators should neither encourage nor discourage the use of this type of fuel.

[10] Joint Airworthiness Requirements — Operations (JAR-OPS) 1, as well as EU-OPS rules also allowed the use of contingency fuel for taxi.

IN-FLIGHT REPLANNING

This point of the GM is related to point CAT.OP.MPA.181 (d). It explains the instances where a flight can be replanned even when nothing would prevent it from being completed as initially planned. This implies a voluntary change of the destination aerodrome. When this happens, the initial flight plan has to fulfil all the requirements of the new flight plan.

This GM point also explains when in-flight replanning does not apply.

AMC6 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME WITH VARIATIONS — CONTINGENCY FUEL'

This AMC incorporates parts of the current AMC1 CAT.OP.MPA.150(b).

For successful implementation of a contingency fuel variation, a correct fuel performance factor or similar number is needed. This requires relevant data and, therefore, time. For example, statistically, 2-year data is required for contingency fuel. For that reason, new operators do not qualify for current variations.

Point (c)

A fuel consumption monitoring system is required for the 3 % fuel ERA and the other contingency fuel variations. The feedback provided by RG RMT.0573 is that in new aircraft, real consumption may divert from the manufacturer's data by up to 3-4 %. Therefore, it is necessary to have a fuel consumption monitoring system when contingency fuel is reduced below 5 %.

The principle of the proposed new point CAT.OP.MPA.181 (a)(4)(i) at IR level is the use of a fuel consumption monitoring system as a first option. Only new operators will have to use manufacturers' data. This way, the fuel consumption monitoring system will be fostered.

According to ICAO, any other contingency fuel than 5 % is subject to 'variation'. This means that in addition to the fuel consumption monitoring programme, a risk assessment should be made and the requirements of ICAO Annex 6, Part I, SARP 4.3.6.6 should be met. The variation proposed AMC6 CAT.OP.MPA.181 is an intermediate approach, where not all the requirements of SARP 4.3.6.6 are considered necessary. This approach improves usability while maintaining a high level of safety.

Note: if an operator, voluntarily or based on operational requirements, chooses to protect some or all of the contingency fuel to the destination aerodrome, this would require an increase in the trip fuel. In other words, if an operator chooses to protect 5 % of the trip fuel as contingency fuel to the destination, then the trip fuel will need to be adjusted upwards to account for the extra weight. For example, 5 % of a 100-ton trip burn is 5 tons. If an operator plans to carry 5 tons of contingency fuel to the destination, an additional 2-ton trip fuel may be needed to carry it. Thus, on a 10-hour flight, an operator could board 7 tons of additional fuel: 5 tons as 5% contingency fuel plus 2 tons of additional trip fuel to carry and protect the total amount of fuel all the way to the destination.

If the contingency fuel is not protected to the destination aerodrome, then no adjustment is made to the trip fuel, and contingency fuel is simply added as a straight percentage of the trip fuel.

The concepts of 'protected' and 'unprotected' contingency fuel must be clearly understood, as any flight may have more or less fuel buffer when it does not run as originally planned.

For RG RMT.0573, the unprotected contingency fuel is a means to demonstrate compliance with point CAT.OP.MPA.181 (c)(3). However, the final decision still lies with the competent authority.

AMC7 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME WITH VARIATIONS — LOCATION OF THE FUEL EN ROUTE ALTERNATE AERODROME TO REDUCE CONTINGENCY FUEL TO 3%' (amended)

This AMC includes the content of the deleted current AMC2 CAT.OP.MPA.150(b) 'Fuel policy LOCATION OF THE FUEL EN-ROUTE ALTERNATE (FUEL ERA) AERODROME'.

GM2 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes BASIC FUEL SCHEME WITH VARIATIONS — STATISTICAL CONTINGENCY FUEL METHOD' (new)

This new GM contains the amended text of the current GM1 CAT.OP.MPA.150(b).

AMC8 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING SYSTEM' (new)

This AMC sets the conditions for a data-driven method that comprises a fuel consumption monitoring system. It is related to point CAT.OP.MPA.181 (a)(4)(i).

The content of this AMC was based on ICAO Doc 9976, Chapter 5, Appendix 7:

'Aeroplane performance monitoring.

(a) The operator should maintain a database of valid fuel consumption data used to calculate its required fuel planning figures of the preceding one to five years. This historical data should be flight-, aeroplane type-, and route-specific and could be used by both the regulator and the operator to monitor fuel planning trends and performance.

(b) Specific aeroplane data acquisition and processing procedures that result in a detailed analysis of each aeroplane's individual fuel burn performance (fuel bias).

(c) The operator should provide a comparative analysis of actual en-route fuel consumption versus flight planned consumption.'

GM3 CAT.OP.MPA.181 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — aeroplanes INDIVIDUAL FUEL SCHEME — ANTICIPATED METEOROLOGICAL CONDITIONS' (new)

This GM refers to systems that provide better meteorological information, similar to the FAA's enhanced weather information system (EWINS)[11]. It is linked to point CAT.OP.MPA.181 (b)(3).

Point CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes' (amended)

Both title and content of the current point CAT.OP.MPA.182 'Destination aerodromes — instrument approach operations' are amended. The current content is moved to the new point (f) for aeroplane operations, as well as to the new point CAT.OP.MPA.192 (d) for helicopter operations.

The new text incorporates the current content of point CAT.OP.MPA.106 'Use of isolated aerodromes — aeroplanes'. It also includes the safety objective of the current points CAT.OP.MPA.180 and CAT.OP.MPA.183, as these IRs are moved to AMC.

11 http://fsims.faa.gov/WDocs/8900.1/V03%20Tech%20Admin/Chapter%2026/03_026_004.htm

Point (a)

Point CAT.OP.MPA.182 (a) contains the general safety objective for all types of CAT flights; this may include local flights (A-A), VFR flights, operations to isolated aerodromes, as well as the traditional instrument flight rules (IFR) flights from A to B (note: IFR also apply to point CAT.OP.MPA.182 (d)), etc.

This point ensures that the flight is planned in a way that there is an aerodrome available where a safe landing can be made at the estimated time of use of this aerodrome; therefore:

(a) the aircraft carries sufficient fuel: the 'safe landing' definition where more than the FRF is required provides for this requirement; and

(b) there is reasonable certainty that the adequacy of the aerodrome and the meteorological conditions will allow a safe landing.

The operator typically fulfils this requirement by selecting a destination aerodrome above the operating minima.

Maximum distance to an adequate aerodrome: the safety objective of point CAT.OP.MPA.182 provides flexibility as regards the maximum distance to an adequate aerodrome ([…] an aerodrome where a safe landing can be made […]) as it does not further prescribe where this landing option must be. The maximum distance to an adequate aerodrome (safety objective) is to be found in point CAT.OP.MPA.140 or ETOPS documentation. However, point CAT.OP.MPA.182 includes a clear reference to the fuel quantity through the definition of 'safe landing', which states that such landing must be performed with more than the FRF. Thus, the safety objective may be fulfilled as long as the flight is planned with enough fuel and the weather conditions are appropriate.

Point (d) 'ATS flight plan'

The ATS flight plan may include in Item 18 the en route alternate aerodrome (ERA and fuel ERA). ICAO Doc 4444 'Procedures for Air Navigation Services — Air traffic Management', ITEM 18 — PANS ATM states:

'RALT/ ICAO four letter indicator(s) for en route alternate(s), as specified in Doc 7910, Location Indicators, or name(s) of en route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location.'

Point CAT.OP.MPA.182 (d) further specifies and restricts the requirements of point (a) with regard to IFR flights. When analysing the prescriptive requirements of point CAT.OP.MPA.182 (equivalent to ICAO Annex 6, Part I), that there must be:

— two alternate aerodromes when the destination is below minima from 1 h before to 1 h after, i.e. not available;

— one alternate aerodrome when the destination aerodrome is available (same time periods); and

— no alternate aerodromes, provided that two runways are available and certain meteorological conditions are fulfilled from 1 h before to 1 h after,

those requirements reflect the safety objective in the form of two landing options that are available when reaching the destination. As the phrase 'reaching the destination aerodrome' can be subject to interpretation, AMC4 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — REACHING THE DESTINATION AERODROME' and

GM3 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes INDIVIDUAL FUEL SCHEME — REACHING THE DESTINATION AERODROME' are created to clarify this phrase and limit its interpretation.

The reason for having two landing options available when reaching the destination is that towards the end of the flight, the amount of fuel is lower than at the beginning of the flight. This restricts the availability of aerodromes by reducing the number of options and introducing a time-critical element in the decision-making of the commander. Therefore, point CAT.OP.MPA.182 (a) requires at least one landing option, while reaching the destination at the end of the flight (point CAT.OP.MPA.182 (d)) introduces two landing options for IFR flights.

The phrase 'safe landing when reaching the destination aerodrome' means that there must be sufficient fuel to reach the destination and thereafter to proceed to the second landing option, but it does not necessarily mean sufficient fuel for a go-around. Therefore, a decision point close to the destination and not necessarily at the destination (hence, before the destination) may be selected at the planning stage.

As per point (a), the flight must be planned with one aerodrome available for a safe landing once the flight has commenced. This covers the cases of a fuel ERA aerodrome, a take-off alternate aerodrome, and an ETOPS alternate aerodrome from a fuel quantity perspective, as well as any emergency situations.

As per point (d), at the planning stage of the flight, two landing options must be available for a safe landing at the estimated arrival time at the destination or destination alternate aerodrome. The reason for having two options is that the quantity of fuel available towards the end of the flight is more restrictive than at the beginning. This normally includes the destination and destination alternate aerodrome or two landing runways at the destination under normal conditions.

Note: the proposed new requirement has enough flexibility to allow, under individual fuel schemes, a no-alternate policy to a single runway (e.g. two landing options at airports where a runway is used as a taxiway, therefore providing two landing options: a runway plus another runway that is used for taxi).

Point (d)(2) 'reaching the PNR for isolated aerodrome operations'

Complying with a requirement for an isolated aerodrome is in principle an alleviation in terms of fuel calculation. Therefore, instead of complying with: 'the fuel to proceed to destination plus the fuel to proceed to an alternate aerodrome' as required under normal circumstances, the operator may follow the new point CAT.OP.MPA.182 (d)(2).

The requirement of the current CAT.OP.MPA.106 allows the operator, under certain conditions (e.g. approval by the competent authority), to carry less fuel. Thus, point CAT.OP.MPA.106 is used on a voluntary basis, which means that the operator may choose:

— either to carry the fuel to comply with point CAT.OP.MPA.106; or

— to carry sufficient fuel to fly to the destination aerodrome, plus the fuel to proceed to the alternate aerodrome, plus the FRF, as normally required by the current point CAT.OP.MPA.150 or, as proposed in this Opinion, by the new point CAT.OP.MPA.181.

EASA considers that the current rule may create legal uncertainty if an operator is willing to carry the required fuel to proceed to the alternate aerodrome despite the fact that its intended destination fulfils the criteria of an isolated aerodrome.

Point (e) 'appropriate safety margins to flight planning'

For RG RMT.0573, the safety margins are planning minima for the planned approach in terms of weather variations (weather suitability and time window) and duration of flight. The purpose of safety margins is to mitigate weather deviations from the ones originally forecasted and possible failures of the equipment used to fly the approach.

AMC1 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — TAKE-OFF ALTERNATE AERODROME' (new)

This AMC incorporates parts of the current point CAT.OP.MPA.180 'Selection of aerodromes — aeroplanes'.

The current point CAT.OP.MPA.180 (d) ('The operator shall specify any required alternate aerodrome(s) in the operational flight plan') is not incorporated into the rule due to the following reasons:

— for take-off alternate aerodromes, the requirement to specify them in the OFP is maintained in the new point CAT.OP.MPA.182 (b): […] 'the operator shall select and specify in the operational and ATS flight plans' […]; and
— for destination alternates, the content of the requirement is moved to point (a) of AMC2 CAT.OP.MPA.182 'Basic fuel scheme — Aerodrome selection policy — aeroplanes DESTINATION ALTERNATE AERODROME'.

This change allows a dynamic selection of alternate aerodromes in the individual fuel schemes.

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

Point (c) 'No destination alternate aerodrome' policy

RG RMT.0573 discussed this AMC against ICAO SARP 4.3.4.3.1 that requires an instrument approach, which is considered more restrictive than the EU rule. The requirement for an instrument approach may restrict the use of the no-alternate aerodrome policy (e.g. NOTAM indicating that there is no instrument approach for that day or a destination that has no instrument approach).

The EU rule could thus be as restrictive as the ICAO SARP; however, current data shows that the rule is safe. EASA will reconsider the rule or develop additional mitigation measures if a safety case that is based on significant concrete data can be developed.

AMC3 CAT.OP.MPA.182 'Fuel scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — AERODROME FORECAST METEOROLOGICAL CONDITIONS' (amended)

It includes the updated content of the current GM2 CAT.OP.MPA.185.

The planning minima, as published in the new Table 2 of AMC6 CAT.OP.MPA.182 and Table 3 of AMC8 CAT.OP.MPA.182 (planning minima for basic fuel schemes, and for basic fuel schemes with variations, respectively), are brought in line with the ETOPS planning minima and FAA/TCCA minima.

Table 1 of AMC3 CAT.OP.MPA.182 indicates how aerodrome weather forecasts have to be used.

The table containing the 'Planning minima' in AMC1 CAT.OP.MPA.183(d)&(e), published in NPA 2016-06 (A), explained that gusts and runway conditions should be fully taken into account when assessing the planning minima and the cross- and tailwind conditions. After consultation with the RG, Table 1 in the NPA (planning minima) became Table 2 in the draft AMC&GM published with this Opinion (planning minima for basic fuel schemes). Additionally, the content of new Table 2 (completely changed from the NPA version) has been harmonised with the new Table 1 (aerodrome forecasts (TAFs) and landing forecasts (TRENDs) to be used for preflight planning) to correct the inconsistencies of NPA 2016-06 (A).

SIB 2014-20 indicates the risks of strong and gusty crosswind conditions and recommends that operators should publish operational crosswind limitations instead of demonstrated crosswind values and should carefully consider including the gust factor in the operating limitations, following the manufacturer's recommendations.

The actual availability of the runway at a specific aerodrome depends on the estimated weather, wind, and runway conditions at time of arrival in relation to operational (cross)wind limitations that include expected wind changes and gusts.

RG RMT.0573 considered that Table 1 that contains the aerodrome weather forecasts (currently, in GM2 CAT.OP.MPA.185) should be elevated to AMC level, because if operators intend to deviate from the table in the GM, they do not even need to obtain the approval of the competent authority. However, the table should be followed as it is. Considering that this table is frequently used, its change from GM to AMC level should have a minimum impact. Therefore, through this RMT, the table is moved from the current GM2 CAT.OP.MPA.185 to the new AMC3 CAT.OP.MPA.182, as applicable to any basic fuel scheme. Moreover, as it is no longer contained in ICAO Annex 3 (as specified in its OPS rules version), the outdated reference to it is also removed.

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

This AMC explains the IR requirement for operators to carry enough fuel to reach the destination and follows a risk-based approach.

The GM text that was proposed in NPA 2016-06 (A) was elevated to AMC level for consistency with point (b)(4) of AMC1 CAT.OP.MPA.181.

The AMC on basic fuel schemes contains detailed prescriptive rules: reaching the destination is clearly identified as a point in space that is determined by a given altitude and a geographical location, where the pilot has to make a decision to continue to the destination aerodrome or divert to an alternate.

For individual fuel schemes, EASA followed a performance-based approach, based on which 'reaching the destination' is an area rather than a prescriptive point in space. This allows the operator to define the specific point for each flight and each particular aerodrome. However, EASA clearly recommends allocating that point no farther than the initial approach fix (IAF) to limit the likelihood of unforeseen factors after committing to destination.

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

This AMC allows the operator to plan which is the take-off alternate aerodrome without using planning minima but only operating minima (the planning minima table of AMC1 CAT.OP.MPA.182 'Basic fuel

scheme — planning minima' is not applicable to take-off alternate aerodromes). The commander must check the weather of the take-off alternate aerodrome just before departure and in addition, ensure that the weather forecast from 1 h before to 1 h after the estimated time of arrival (ETA) at the aerodrome will be above minima. Thus, the possible imprecision of the weather forecast is reduced (note: a safety margin of +/- 1 h remains in the proposed AMC).

See also AMC 20-6 rev. 2, Appendix 5 'ETOPS en-route alternate aerodromes':

'1. SELECTION OF EN-ROUTE ALTERNATE AERODROMES:

[…]

c. […] In addition, for the same period, the forecast crosswind component plus any gusts should be within operating limits and within the operators maximum crosswind limitations taking into account the runway condition (dry, wet or contaminated) plus any reduced visibility limits.

[…]'

AMC6 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — PLANNING MINIMA' and AMC8 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME WITH VARIATIONS — PLANNING MINIMA'

The new types of instrument approaches (types A and B) were not introduced in NPA 2016-06 (A). However, those two types were introduced in ICAO SARPs, when the final draft rules were being prepared. The definitions of the new instrument approach procedures (types A and B) were included in NPA 2018-06 (C) (RMT.0379 'All-weather operations').

NPA 2018-06 (C) proposed the following definitions for type A and B instrument approach operations:

— 'Type A instrument approach operation' means an operation with a minimum descent altitude/height (MDA/H) or a DA/H at or above 250 ft; and

— 'Type B instrument approach operation' means an operation with a minimum DA/H below 250 ft. Type B instrument approach operations are categorised as:

  — Category I (CAT I): a DA/H not lower than 200 ft with either a visibility of not less than 800 m or a runway visual range (RVR) of not less than 550 m;

  — Category II (CAT II): a decision height (DH) lower than 200 ft but higher than 100 ft with an RVR of not less than 300 m; and

  — Category III (CAT III): a DH lower than 100 ft or no DH with an RVR of less than 300 m or no RVR limitation.

Starting from the decision to include the new types of instrument approach procedures into the fuel rules, RG RMT.0573 challenged the planning minima table for CAT operations with aeroplanes.

Thus, two tables for planning minima were created, each having different values for type B instrument approach operations, to address the needs and capabilities of various operators applying a basic fuel scheme (Table 2) or a basic fuel scheme with variations (Table 3). A focused consultation with NAAs and industry was held in the last phase of the new rules development to collect feedback on this change.

The values in Table 2 are taken from the table that contains planning minima for ETOPS operations (see AMC1 CAT.OP.MPA.140(d)).

Table 3 introduces the requirement that two separate runways are available, as the definition of this term indicates that there must be two different navigation facilities.

Operators that also utilise flight monitoring or flight watch in their operational control system may use the values of Table 3 when possible.

The requirements for alternate weather planning minima were inspired from the 'Alternate Aerodrome Weather Minima Requirements' of the TCCA's 'Aeronautical Information Manual (AIM) 2020-1', paragraph 3.13.1. Table 3.7. As EASA expects an extensive use of required navigation performance (RNP) applications in the future, and to provide as many landing options as possible, RNP approaches with vertical navigation (VNAV) minima capabilities are required. In addition, low visibility operations (LVO) approval is required to reduce missed approaches and go-around procedures to a minimum. Finally, AMC8 CAT.OP.MPA.182 requires close weather monitoring and in-flight replanning as additional mitigation measures to Table 2 of AMC6 CAT.OP.MPA.182 to maintain an equivalent level of safety.

Two or more usable type B instrument approach operations

In the event of two or more feasible type B operations at the destination alternate aerodrome, a single failure on board the aircraft should not jeopardise landing at that aerodrome. Thus, the operator should be able to perform a precision approach with the immediately higher category minima than the one to be performed at the destination alternate aerodrome. For instance, an operator that has decided to perform a CAT IIIC approach (DH > 0 ft and RVR > 0 m) should also be able to perform a CAT II approach (DH > 100 ft and RVR > 300 m) on the same alternate aerodrome.

The table below shows that the required add-ons at planning stage ensure the ability to perform the immediately higher category precision approach:

Category	**Minima**	**Planning minima (Minima + add-ons)**	**Next higher category**	**Next higher category minima**	**Planning minima > next higher category minima**
CAT IIIC	DH > 0, RVR > 0	DH > 100, RVR > 300	CAT II	DH > 100, RVR > 300	Ok
CAT IIIB	DH > 0, RVR > 75	DH > 100, RVR > 375	CAT II	DH > 100, RVR > 300	Ok
CAT IIIA	DH > 50, RVR > 175	DH > 150, RVR > 475	CAT II	DH > 100, RVR > 300	Ok
CAT II	DH > 100, RVR > 300	DH > 200, RVR > 600	CAT I	DH > 200, RVR > 550	Ok

Note: RVR is given in metres and DH in feet

One usable type B instrument approach operation

In the event of only one feasible type B operation at the destination alternate aerodrome, a single failure of the approach facilities should not jeopardise landing at that aerodrome. Thus, the operator should be able to perform a special authorisation (SA) CAT I approach (DH > 150 ft and RVR > 450 m — RVR value based on FAA Order 8400.13D) when a CAT IIIC approach is planned by the operator at

the destination alternate aerodrome. When a CAT I approach is planned, then the operator should also be able to perform a non-precision approach (NPA) (DH > 250 ft and visibility > 1000 m).

The table below requires an add-on at planning stage to ensure that the aeroplane can perform the next higher precision approach.

Category	Minima	Planning minima	Targeted category	Targeted category minima	Planning minima > Targeted category minima
CAT IIIC	DH > 0, RVR > 0	DH > 150, RVR > 450	SA CAT I	DH > 150, RVR > 450	Ok
CAT IIIB	DH > 0, RVR > 75	DH > 150, RVR > 525	SA CAT I	DH > 150, RVR > 450	Ok
CAT IIIA	DH > 50, RVR > 175	DH > 200, RVR > 625	CAT I	DH > 200, RVR > 550	Ok
CAT II	DH > 100, RVR > 300	DH > 250, RVR > 750	NPA	DH > 250, RVR > 750	Ok
CAT I	DH > 200, RVR > 550	DH > 350, RVR > 1000	NPA	DH > 250, RVR > 750	Ok

Note: RVR is given in metres and DH in feet

Two or more feasible type A instrument approach operations

(Note: for definitions of type A and type B instrument approach operations, see Section 2.3.1 of this Opinion and NPA 2018-06 (C) 'All-weather operations'.)

Values are based on the current requirements of point CAT.OP.MPA.185 'Planning minima for IFR flights — aeroplanes'. An equivalent level of safety is ensured by requiring at least two type A instrument approach operations based on separate navigation aids.

Accuracy of weather forecasts

The planning minima under basic fuel schemes with variations should be consistent with:

— the desirable accuracy of weather TAFs, as defined in GM3 MET.TR.220 'Aerodrome forecasts ACCURACY OF TAF' (see AMC and GM to Annex V (Part-MET) to Implementing Regulation (EU) 2017/373[12]), and in ICAO Annex 3 recommended practices; and

— the 'criteria used for the inclusion of change groups in TAF or amendments to TAF', as defined in AMC1 MET.TR.220(f) 'Aerodrome forecasts TAF — USE OF CHANGE GROUPS' (see AMC and GM to Annex V (Part-MET)), and in ICAO Annex 3 recommended practices.

[12] Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580804711138&uri=CELEX:32017R0373).

GM2 CAT.OP.MPA.182 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME —SAFE LANDING OPTIONS' (new)

This GM expands on the intent of point CAT.OP.MPA.182 (d) and provides examples of the two options for a safe landing under a basic fuel scheme.

AMC1 CAT.OP.MPA.182(f) 'Fuel/energy scheme — aerodrome selection policy — aeroplane BASIC FUEL SCHEME — DESTINATION AERODROMES — PBN OPERATIONS' (new AMC number and title)

AMC1 CAT.OP.MPA.182 is renumbered (and changed in its title) as new AMC1 CAT.OP.MPA.182(f), applicable to aeroplanes, and as new AMC1 CAT.OP.MPA.192(d), with the same changed title, applicable to helicopters.

GM1 to AMC1 CAT.OP.MPA.182(f) 'Fuel/energy scheme — aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — DESTINATION AERODROMES — PBN OPERATIONS' (new GM number and title)

GM1 CAT.OP.MPA.182 is also renumbered (and changed in its title) as new GM1 to AMC1 CAT.OP.MPA.182(f), applicable to aeroplanes, and as a new GM1 CAT.OP.MPA.192(d), applicable to helicopters.

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

This AMC incorporates part of the current point CAT.OP.MPA.106.

Current point CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes' (amended)

The content of the current point CAT.OP.MPA.185 'Planning minima for IFR flights — aeroplanes' is incorporated into the new CAT.OP.MPA.182 'Fuel scheme — aerodrome selection policy — aeroplanes' and AMC3 CAT.OP.MPA.182 'Fuel/energy scheme — Aerodrome selection policy — aeroplanes BASIC FUEL SCHEME — AERODROME FORECAST METEOROLOGICAL CONDITIONS'. New title and content are introduced.

Current GM1 CAT.OP.MPA.185 'Planning minima for IFR flights — aeroplanes PLANNING MINIMA FOR ALTERNATE AERODROMES' (amended)

The content of the current GM1 CAT.OP.MPA.185 is deleted and redrafted, and its title changed to 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL SCHEME'.

Current GM2 CAT.OP.MPA.185 'Planning minima for IFR flights — aeroplanes AERODROME WEATHER FORECASTS' (deleted)

Its content is amended and moved to the new AMC3 CAT.OP.MPA.182.

New point CAT.OP.MPA.185 'Fuel scheme — in-flight fuel management policy — aeroplanes'

The title and content of point CAT.OP.MPA.185 are new. It also includes a part of the current point CAT.OP.MPA.280 'In-flight fuel management — aeroplanes', which is deleted.

The establishment of procedures for in-flight fuel management is considered crucial in the new context of fuel planning and management. The procedures for in-flight fuel management need to be closely linked to the training provided to flight crew, thus ensuring compliance also with the

requirement of point ORO.GEN.200 (a)(4) on maintaining the personnel trained and competent to perform their tasks.

This requirement describes a coordinated escalation process with regard to ATC and FRF protection. Although each situation is different and may be handled at any stage of the process, normally, this process should follow a three-step approach (the EU approach follows the rationale of ICAO Doc 9976):

— Step 1: request delay information when required (as per point CAT.OP.MPA.185 (b) and ICAO Annex 6, Part I, Section 4.3.7.2.1);

— Step 2: declare 'MINIMUM FUEL' when committed to land at a specific aerodrome and any change in the clearance may result in landing with less than the planned FRF (as per point CAT.OP.MPA.185 (c) and ICAO Annex 6, Part I, Section 4.3.7.2.2); and

— Step 3: declare 'a situation of fuel/energy emergency' when the calculated fuel on landing at the nearest suitable aerodrome where a safe landing can be made will be less than the planned FRF (as per point CAT.OP.MPA.185 (d) and ICAO Annex 6, Part I, Section 4.3.7.2.3).

For further information, please refer to ICAO Doc 9976, Chapter 6.10 'Minimum fuel and MAYDAY (due to fuel) declaration scenarios'.

The requirement related to the 'MINIMUM FUEL' call is included in point SERA.11012 'Minimum Fuel and Fuel Emergency' of the Annex to Implementing Regulation (EU) 2016/1185[13].

Point (a)(3)

The amount of usable fuel remaining on board must not be less than the fuel required to proceed at an aerodrome where a safe landing can be made with the planned FRF remaining upon landing.

This point is introduced to mitigate the risk when the operator follows the policy of no destination alternate aerodrome (ICAO Annex 6, Part I, SARP 4.3.7.2.1).

'Safe landing'

The term 'safe landing' is used to ensure that the commander must always consider first the safe landing option. The commander must declare a fuel emergency whenever a safe landing cannot be performed without using the FRF. Only after declaring fuel emergency, other landing options may be considered.

If 'safe landing' were not included in point (c), it would be possible to consider unsafe landing options without declaring fuel emergency, e.g. a military airport or an unprepared runway where a landing can be performed with remaining fuel upon landing that is higher than the FRF. This situation must be avoided.

The following example illustrates this situation:

Actual fuel on board is 1 500 kg. The FRF is 1 000 kg. The required trip fuel to reach a safe landing option is 600 kg. The required trip fuel to reach an unprepared runway is 300 kg. The fuel remaining

[13] Commission Implementing Regulation (EU) 2016/1185 of 20 July 2016 amending Implementing Regulation (EU) No 923/2012 as regards the update and completion of the common rules of the air and operational provisions regarding services and procedures in air navigation (SERA Part C) and repealing Regulation (EC) No 730/2006 (OJ L 196, 21.7.2016, p. 3) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580809330519&uri=CELEX:32016R1185).

when landing on the nearest safe landing option is: 1500 – 600 = 900 kg, which is lower than the FRF. Hence, the commander must declare 'MAYDAY' as per the new IR.

The fuel remaining when landing on an unprepared runway is: 1500 – 300 = 1200 kg, which is higher that the FRF. If 'safe landing' were removed from the IR, the commander would no longer need to declare 'MAYDAY' and could opt to land on an unprepared runway.

This new IR prevents the use of the second option as it is considered less safe; therefore, 'safe landing' is kept in the proposed IR.

Point (b)

The related ICAO SARP mandates the commander to request delay information from a reliable source (an ATC or another similar reliable source).

The current IR prescribes that the commander must take into account the prevailing traffic and operational conditions, without specifying how such information should be obtained. The proposed amendment introduces the flexibility to collect information through any reliable source and not just the ATC (as required by ICAO Annex 6, Part I, SARP 4.3.7.2.1). Such a reliable source could be contacted, for example, via the operator's system for exercising operational control. This flexibility increases the range of information available to the commander to decide the best course of action when the alternate fuel is being consumed.

The condition to contact the ATC to obtain information on delays remains in point (b)(2)(i) of AMC1 CAT.OP.MPA.185(a). The new point (c) of GM1 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL SCHEME — RELIABLE SOURCE TO OBTAIN DELAY INFORMATION' establishes the criteria that a reliable source of information should meet.

In-fight fuel management policies are not intended to replace preflight planning or in-flight replanning activities, but act as controls to ensure that planning assumptions are continually validated. Such validation is necessary to initiate, when necessary, the reanalysis and adjustment activities that will ultimately ensure the safe completion of each flight.

Point (c) 'MINIMUM FUEL' declaration

The current IR is updated to reflect the changes to ICAO Annex 6 and Doc 4444 'Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM)' with regard to 'minimum fuel'. The use of such a requirement, which is already mandated by several EASA Member States through their aeronautical information publications (AIPs), improves coordination between flight crew and ATC when anticipating emergency or distress situations.

The addition of such a requirement to the IR enhances the safety aspects of the current in-flight fuel management requirements (see also SIB 2018-08).

Point (d) 'MAYDAY MAYDAY MAYDAY FUEL'

The current IR is updated to reflect the changes to ICAO Annex 6 and Doc 4444 'PANS-ATM' with regard to situations of fuel emergency. Use of the standard call 'MAYDAY FUEL' promotes safety as it provides an immediate and clear understanding of the nature of the emergency both to ATC and the commanders of other flights operating on the same frequency.

The text of point (d) stems from ICAO Annex 6, Part I, SARP 4.3.7.2.3:

'The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.'

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' (new)

This AMC includes parts of the current point CAT.OP.MPA.280 'In-flight fuel management — aeroplanes' that is deleted.

Point (a)(1) 'regular intervals for in-flight fuel checks'

The term 'regular intervals' generated discussions on the possible different interpretations. RG RMT.0573 decided to introduce as guidance a new GM with an example.

Point (a)(3) 'relevant fuel data to be recorded'

RG RMT.0573 discussed the recording of the relevant fuel data. The discussion was also triggered by several comments on NPA 2016-06 (A).

The discussion started with the range of applicability of this AMC: should it be applicable only to individual fuel schemes (as initially proposed) or to basic fuel schemes and basic fuel schemes with variations as well? RG RMT.0573 decided that the requirement should apply to all fuel schemes, but with some differences.

RG RMT.0573 had therefore to determine what is 'relevant' in the context of basic fuel schemes and basic fuel schemes with variations (GM on individual fuel schemes was already included in NPA 2016-06 (A)). RG RMT.0573 agreed that recording this data (including fuel remaining upon landing) is necessary for the understanding of the data in the context of the mandatory occurrence reporting. In addition, recording this data is the actual condition for issuing 'minimum fuel' and 'emergency fuel' calls. Such data can be recorded either in the technical log (to be stored for 36 months) or in the flight planning records (to be stored for a much shorter period: 3 months).

Other benefits from collecting relevant fuel data are the following:

— data records are created for further analysis and efficiency increase;

— the proper route cause for fuel starvation occurrences is determined;

— clearer statistics of fuel consumption can be produced; and

— training needs for pilots and ATC can be better assessed.

RG RMT.0573 provided feedback from various perspectives on the relevant fuel data that need to be recorded within basic fuel schemes and basic fuel schemes with variations: the operator's perspective, the pilot's perspective, as well as the competent authority's perspective.

RG RMT.0573 also analysed the relation between the relevant fuel data to be recorded (especially when they are linked to 'minimum fuel' declarations or 'emergency fuel' calls) and the operator's safety management system (SMS), as it is expected that the former should feed the latter. Although from this perspective the requirement could have been inserted in Subpart ORO.GEN just as well, it was decided to keep it where it was initially proposed, i.e. in Subpart CAT.OP.MPA.

The rationale behind GM1 CAT.OP.MPA.185 provided below explains further the 'minimum fuel' call.

Point (a)(3) — 'de-identification of collected data'

Another element identified was that not all air operators consistently apply 'just culture' as a policy. This was a strong argument in favour of adding a clear requirement for the protection of collected fuel data.

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' (new)

This AMC was introduced based on feedback from RG RMT.0573. RG RMT.0573 remarked that in AMC1 CAT.OP.MPA.185(a), as published in NPA 2016-06 (A), it was not clear whether operators that apply a basic fuel scheme should consider point (b) of AMC1 CAT.OP.MPA.185(a), which is related to isolated aerodromes, as isolated aerodromes are a variation of the basic fuel scheme, thus applicable to operators that apply a basic fuel scheme with variations. This new AMC2 CAT.OP.MPA.185(a) is therefore created to include the additional procedures applicable to a basic fuel scheme with variations.

Point (b) 'calculation of the PNR for flights on isolated aerodromes'

RG RMT.0573 also discussed the need to develop a GM to indicate a method for pilots to calculate the PNR in flight. RG RMT.0573 decided that since this calculation is done by the computerised planning system (a basic fuel scheme with variations requires flight monitoring and flight watch capabilities from the operator) and not manually, the formulae to calculate the PNR could be included in future safety promotion material, and not in a GM.

AMC3 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes INDIVIDUAL FUEL SCHEME — COMMITTING TO LAND AT A SPECIFIC AERODROME' (new)

This AMC is created to raise awareness and encourage the operator's operations control centre (OCC) structure to be proactive in furnishing the relevant information to the cockpit when the commander has to decide to commit to land at a specific aerodrome. It is related to the concept of 'reaching the destination' when relevant information from the OCC is decisive for the commander's commitment to land at a specific aerodrome.

GM1 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL SCHEME — RELEVANT FUEL DATA TO BE RECORDED' (new)

This part of the GM is related to point (a)(3) of AMC1 CAT.OP.MPA.185.

The condition to record relevant fuel data is introduced into the related AMC1 CAT.OP.MPA.185(a) after repeated feedback was received from the accident and incident investigation boards of several EASA Member States (especially the Spanish ones that investigated the fuel incident of 26 July 2012 in Valencia), as well as from the competent authorities of several EASA Member States (especially the Civil Aviation Authority of the United Kingdom (UK CAA) that carried out an in-depth analysis of the subject).

Modern aircraft allow to record the fuel amount just before take-off and just after landing, therefore, the competent authorities are encouraged to request the operators to record these figures. The comparison between off-block fuel and take-off fuel can provide a good indication of taxi fuel calculations and of whether the operator consistently uses contingency fuel for taxi. This practice should be discouraged.

In accordance with Regulation (EU) No 996/2010[14], minimum fuel does not trigger any mandatory occurrence reporting. However, the operator should record the amount of minimum fuel declared as this data provides a good safety performance indicator (SPI) of the operator's fuel scheme.

This GM clarifies that it is at the operator's discretion to decide how long the regular intervals for fuel recording should be. It provides examples of regular intervals for long-haul flights and short-haul flights.

In addition, the GM provides a list of fuel data that are considered relevant for recording by operators, when applying a basic fuel scheme or a basic fuel scheme with variations.

This list of relevant data to be recorded is linked to the requirement of point CAT.OP.MPA.180 (d) on the baseline SPIs of an operator's current fuel scheme. A similar GM is created for individual fuel schemes (GM2 CAT.OP.MPA.180). While the recording of such data will be useful for operators to determine the robustness and safety of its fuel scheme, this data will also enable operators to move from their current fuel schemes to more performance-based ones, once they have gained the necessary experience and collected the required data.

RELIABLE SOURCE TO OBTAIN DELAY INFORMATION

Air navigation service providers (ANSPs) are considered to have the characteristics of a reliable source, which cannot be replaced by information found on the internet or another similar source.

This does not imply that the flight crew should directly contact the ANSP to obtain information, but that they can receive the information via the operator's OCC.

RG RMT.0573 discussed this GM proposal and agreed on a number of features that a reliable source of information on delays should have.

The rationale behind point CAT.OP.MPA.185 (b) above expands further on this topic.

'MINIMUM FUEL' DECLARATION (point CAT.OP.MPA.185 (c))

Notes 1 and 2 of ICAO Annex 6, Part I, SARP 4.3.7.2.2 address the scope and implications of the 'MINIMUM FUEL' call, thus providing operators with clear expectations about the declaration of 'MINIMUM FUEL'.

RG RMT.0573 discussed this topic at length. There are numerous cases where the 'minimum fuel' declaration was wrongly used, as there is a different level of understanding between ATC personnel and pilots as well as among pilots regarding the use of this declaration.

RG RMT.0573 reviewed a significant number of occurrence reports indicating that the 'minimum fuel' call was treated as an emergency when, in fact, it was only a miscalculation of fuel quantity or misinterpretation of the current regulations by either ATC or pilots. At the same time, in accordance with Regulation (EU) No 376/2014[15] (amending Regulation (EU) No 996/2010), the 'minimum fuel'

[14] Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580822280503&uri=CELEX:32010R0996).

[15] Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007 (OJ L 122, 24.4.2014, p. 18) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580825192600&uri=CELEX:32014R0376)

declaration does not have to be reported. Therefore, operators do not have enough data to establish the correct route cause of fuel starvation occurrences.

Due to the lack of such data that would help to determine the source of the errors, RG RMT.0573 discussed whether the 'minimum fuel' call should become a reportable event through a new IR in both the Air OPS Regulation and Regulation (EU) No 376/2014 on occurrence reporting. The conclusion was that since the 'minimum fuel' declaration is not a safety event per se, operators should not report it but record it internally. For the same purpose of collecting more data to better understand the causes of misuse, the amount of fuel upon landing should be part of the relevant data to be recorded.

RG RMT.0573 developed in this GM three typical examples of cases where the 'minimum fuel' declaration should be made.

RG RMT.0573 also concluded that additional training should be provided to operators and ATC units to clarify the meaning and use of similar messages, such as 'MINIMUM FUEL', 'PAN PAN PAN' and 'MAYDAY MAYDAY MAYDAY FUEL'. EASA will provide further support on this topic through safety promotion activities, following publication of this Opinion.

Furthermore, this GM includes a reference to ICAO Doc 9976, as well as several sample scenarios to explain when 'MINIMUM FUEL' should be declared and what the ATC's reaction should be.

ENSURING A SAFE LANDING — FINAL RESERVE FUEL PROTECTION

This part of the GM addresses landing options on other-than-adequate aerodromes to clarify that the FRF must always be protected. This part, which is slightly redrafted to also address comments received on NPA 2016-06 (A), is based on ICAO Annex 6:

'4.3.7.2 The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

Note: the FRF protection is intended to ensure a safe landing at any aerodrome when unforeseen occurrences may not permit safe completion of an operation as originally planned. Guidance on flight planning, including the circumstances that may require re-analysis, adjustment and/or re-planning of the planned operation before take-off or en route, is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).'

The term 'safe landing' is explained in the context of protecting the final reserve fuel both during normal and emergency operations.

In addition, this part explains 'safe landing' in the context of the Air OPS Regulation, particularly with regard to the FRF protection where 'adequate aerodrome' is used instead of the ICAO 'unqualified aerodrome'.

This part of the GM clarifies that FRF protection during normal operations is applicable to aerodromes that were assessed as 'adequate aerodromes' by the operator (see Definitions, point CAT.OP.MPA.105 'Use of aerodromes and operating sites', as well as point (a)(A)(8.1.2) 'Criteria and responsibilities for determining the adequacy of aerodromes to be used' of AMC3 ORO.MLR.100 'Operations manual — general').

Exercising other last-ditch landing options (e.g. military aerodromes, closed runways, 'emergency' aerodromes) is subject to the emergency declaration 'MAYDAY FUEL'. In such a case, the commander

'may deviate from rules, operational procedures and methods in the interest of safety', as stated in point CAT.GEN.MPA.105 (b).

The part also provides a reference to ICAO Doc 9976 for developing the operator's in-flight fuel management policy and procedures, especially with respect to the protection of the FRF under normal operations, including replanning or committing to a single landing option.

FURTHER GUIDANCE ON PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT

This part of the GM refers to ICAO DOC 9976 for further guidance.

Point CAT.OP.MPA.186 'Planning minima for IFR flights — helicopters' (deleted)

The content of this IR is partially moved to the new AMC1 CAT.OP.MPA.192(a) 'Selection of aerodromes and operating sites — helicopters PLANNING MINIMA FOR TAKE-OFF ALTERNATE AERODROMES' and 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'.

GM1 CAT.OP.MPA.186 'Planning minima for IFR flights — helicopters PLANNING MINIMA FOR ALTERNATE AERODROMES' (deleted)

This GM is deleted.

Point CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft' (new)

A new IR that combines all special refuelling and defueling procedures is introduced. The IR is technology-agnostic and simply provides the safety objective and the descriptions of the different fuelling and defueling procedures. This should allow EASA in the coming years to develop new AMCs, as the electrical, hybrid, hydrogen and other forms of energy start appearing on the market.

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

Refuelling with an engine running is hazardous and should normally be avoided.

However, some type certificate (TC) holders developed specific procedures for hot refuelling under unforeseen and exceptional circumstances, i.e. APU unserviceability in the absence of suitable ground support equipment.

Despite precautions taken at dispatch through an appropriate revision of the MEL procedures, this type of refuelling may still be required in remote cases.

The risk of fire is still considerable, given the combination of low probability and high severity. Currently, no related IR exists. However, EASA published on 23 May 2014 SIB 2014-16 on aeroplane refuelling with one engine running after an EASA Member State raised the issue of European operators inconsistently applying procedures for hot refuelling.

Those issues were taken into account in this new AMC that proposes a way forward for implementing the requirements related to refuelling with an engine running.

AMC2 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft OPERATIONAL PROCEDURES FOR REFUELLING WITH AN ENGINE RUNNING — AEROPLANES' (new)

This AMC establishes procedures for refuelling with an engine running. It further details AMC1 CAT.OP.MPA.200, which should help operators and competent authorities develop and approve procedures for such operations.

AMC5 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft REFUELLING OR DEFUELING WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING' (new)

The current point CAT.OP.MPA.195 'Refuelling/defuelling with passengers embarking, on board or disembarking' is renumbered as AMC5 CAT.OP.MPA.200.

AMC6 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft OPERATIONAL PROCEDURES WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING — AEROPLANES' (new)

The 'GENERAL' and 'AEROPLANES' parts of the current AMC1 CAT.OP.MPA.195 'Refuelling/defuelling with passengers embarking, on board or disembarking' are renumbered as AMC5 CAT.OP.MPA.200 and amended.

AMC8 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft REFUELLING/DEFUELLING WITH WIDE-CUT FUEL' (new)

This AMC contains the text that is currently in point CAT.OP.MPA.200. This change from IR to AMC level was made to render the IR technology-neutral, while point CAT.OP.MPA.200 has now new content.

Point CAT.OP.MPA.245 'Meteorological conditions — all aircraft' (amended)

This point is slightly amended. To ensure consistency throughout the IRs and correct implementation, the phrase 'commence take-off' is replaced by 'commence the flight'. Through this change, the IR's requirement includes taxi, which triggered the development of additional IRs for taxi fuel and unforeseen delays, as well as appropriate related GM (see the amended point CAT.OP.MPA.181 and associated GM). In addition, in-flight fuel management is improved as, among others, this new IR incorporates ICAO Annex 6, Part I, SARP 4.3.6.7.

Point CAT.OP.MPA.246 'Meteorological conditions — aeroplanes'

This point is amended to include the term 'fuel/energy'

Point CAT.OP.MPA.280 'In-flight fuel management — aeroplanes'

The content of this point is moved to point CAT.OP.MPA.185.

2.3.2.3 Overview of changes to Part-CAT and Part-SPA operations for helicopters, as well as helicopter-specific changes to Part-NCC, Part-NCO, and Part-SPO

Changes to the fuel policy

'LHO' is added to the definition of the term 'local helicopter operation' in Definitions to ensure that that term is not understood as plain English, and to clarify that the introduced acronym is part of the term's definition. This helps the reader to identify that even though most helicopter operations are local, 'LHO' refers to a specific kind of operations with helicopters of a given mass. 'LHO' was introduced to incorporate Joint Airworthiness Requirements — Operations (JAR-OPS) into the Air OPS

Regulation. Since 'LHO' is used in point CAT.OP.MPA.100 and in the fuel policy, it is also introduced into that point.

The new point CAT.OP.MPA.191 includes the current points CAT.OP.MPA.150 and CAT.OP.MPA.151 (b), as amended, to:

— Rebrand fuel policies as fuel/energy schemes, acknowledging that helicopter fuel requirements are closely related to the selection of aerodromes, and better harmonise helicopter with aeroplane rules.

— Clarify the intent and scope of the 'fuel alleviation' included in the current point CAT.OP.MPA.151.

— Clarify the fuel alleviation's applicability criteria.

— Finalise the transposition of JAR-OPS 3.005(g).

— Consistently use best-range speed for the calculation of the VFR FRF. Even though the FRF may be slightly increased during night VFR flights, this reflects the additional risks that are specific to night VFR flights. In addition, the total-fuel requirements are most likely to be higher when flying under IFR.

— Simplify the terminology by using 'operating sites' instead of 'precautionary landing sites' in both the new point CAT.OP.MPA.191 and the amended point SPA.HEMS.150. The conditions remain the same. When a lower FRF value is conditional on the environment that provides continuous operating sites, prior owner permissions to land at these operating sites are not necessary. Prior permission is required only at operating sites at which the operator intends to land at fuel planning stage, i.e. destination and alternates.

— Provide the option to fly under IFR to a destination with no official aviation weather forecasts and only a single alternate. With point-in-space approaches, this situation is expected more often in the future.

Point SPA.HEMS.150 is amended to:

— clarify that it can be used as an alternative to the standard fuel/energy scheme that would otherwise still apply;

— clarify that the reduced FRF can only be used when suitable operating sites can be safely reached, therefore, not at night; and

— consistently use best-range speed for the calculation of the VFR FRF.

Point SPO.OP.131 is amended to be consistent with Part-CAT, Part-NCC, and Part-NCO in the use of holding speed for the calculation of the IFR FRF.

A new point CAT.OP.MPA.191 is created.

The related new AMC1 CAT.OP.MPA.191(b)&(c) 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — helicopters PLANNING CRITERIA' is also created accordingly, to:

— consistently use best-range speed for the calculation of the VFR FRF;

— be consistent with Part-SPO, Part-NCC, and Part-NCO in the use of destination alternate (or destination if there is no alternate) for the calculation of the IFR FRF; and

— remain consistent with aeroplanes by moving the FRF values from the current AMC3 CAT.OP.MPA.150(b) (deleted) to the new AMC1 CAT.OP.MPA.191(b)&(c).

Changes to the in-flight fuel management policy

The current points CAT.OP.MPA.281 (deleted and renumbered as new point CAT.OP.MPA.195), NCC.OP.205, NCO.OP.185, and SPO.OP.190, as well as the related AMC & GM, are amended to:

— be harmonised with ICAO regarding the 'MINIMUM FUEL' and 'MAYDAY FUEL' broadcasts; and

— describe how the FRF should be protected.

Changes to refuelling procedures

AMC3 ORO.MLR.100 is amended for clarification.

New points CAT.OP.MPA.200, NCC.OP.155, NCC.OP.157, NCO.OP.145, NCO.OP.147, SPO.OP.155, SPO.OP.157, and related AMC & GM, are created to regulate helicopter refuelling with rotors turning to:

— be harmonised with the ICAO working group;

— reflect relevant industry best practice;

— continue current operations, provided that appropriate safety measures remain in place; and

— require a prior approval for refuelling with rotors turning unless this is already covered by another approval.

The current points CAT.OP.MPA.195 and CAT.OP.MPA.200 are merged into the new point CAT.OP.MPA.200.

The helicopter part of the current AMC1 CAT.OP.MPA.195 'Refuelling/defueling with passengers embarking, on board or disembarking' is deleted and the helicopter specifics are introduced into the new AMC2 CAT.OP.MPA.200.

Point SPA.HEMS.155 is amended for consistency, as Part-CAT already covers all refuelling with passengers on board.

<u>AMC1 SPA.HOFO.110(a)(4) 'Operating procedures REFUELLING PROCEDURE' (new)</u>

This AMC is created to acknowledge that refuelling with rotors turning is a component of offshore operations.

<u>Point CAT.OP.MPA.177 'Submission of the ATS flight plan' (new)</u>

The current point CAT.OP.MPA.190 'Submission of the ATS flight plan' is renumbered as point CAT.OP.MPA.177.

<u>AMC1 CAT.OP.MPA.177 'Submission of the ATS flight plan FLIGHTS WITHOUT ATS FLIGHT PLAN' (new)</u>

The current AMC1 CAT.OP.MPA.190 'Submission of the ATS flight plan FLIGHTS WITHOUT ATS FLIGHT PLAN' is renumbered as AMC1 CAT.OP.MPA.177.

Point CAT.OP.MPA.191 'Fuel/energy scheme — fuel/energy planning and in-flight replanning policy — helicopters' (new)

It includes part of the current point CAT.OP.MPA.150 and related AMC, as well as part of the current CAT.OP.MPA.151 on fuel policy alleviations.

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

It incorporates the amended text of the current AMC2 CAT.OP.MPA.150(b), which is deleted.

Point CAT.OP.MPA.192 'Selection of aerodromes and operating sites — helicopters' (new)

This point incorporates the content of the current point CAT.OP.MPA.181 'Selection of aerodromes and operating sites — helicopters', as amended, as well as of point CAT.OP.MPA.182 'Destination aerodromes — instrument approach operations'.

EASA acknowledged that the IRs defining the need for alternates could be summarised for helicopters as for aeroplanes by requiring:

— two landing options;

— contingencies in case of loss of navigation aids; and

— contingencies in case the actual weather is worse than the forecast one.

The remainder of points CAT.OP.MPA.181 to 186 that define the number of alternates, as well as the weather minima at destination and at destination alternates, was moved to AMC level.

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

The current point CAT.OP.MPA.186 (a) 'Planning minima for IFR flights — helicopters' is deleted and moved to this AMC. While the requirement for take-off alternates remains in the IRs, weather minima at take-off alternates are moved to AMC level where all weather minima are defined.

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 (new)

This AMC incorporates elements of the replaced points CAT.OP.MPA.181 (b) to (e), and the deleted point CAT.OP.MPA.186 (b), which define the number of alternates, as well as the weather minima at destination and destination alternates.

The AMC is further amended based on a key comment received during the NPA 2016-06 (B) consultation. The commentator highlighted that helicopters may benefit either from non-Part-MET-certified weather information at the landing site or from off-site Part-MET-certified information that remains relevant for the landing site. Indeed, helicopters fly to places with no aerodrome infrastructure. They can do so under IFR when a point-in-space approach is available. The range of a helicopter is usually much shorter than that of an aeroplane, which makes it more difficult to find landing alternates within its fuel range. When two alternates are needed, fuel requirements may become so restrictive that IFR operations are not possible.

This new AMC is therefore introduced to allow helicopters to fly under IFR to such destinations with only one alternate, including mitigation measures to ensure that the level of safety remains the same.

One of the mitigation measures ensures that the available weather information remains reliable, when not Part-MET certified. The use of non-part-MET-certified but reliable weather information is consistent with the EASA Weather Information to Pilots Strategy Paper.

Increased weather minima at the alternate mitigate the greater risk of the alternate being needed due to unforeseen weather conditions at destination.

It is of strategic importance that the pilot receives an in-flight update of the weather information at destination to decide whether to continue to destination or anticipate a diversion. When only non-part-MET-certified weather information is available at destination, the use of an in-flight weather application on an electronic flight bag (EFB) is therefore considered an acceptable means of receiving the update, as well as any other means that comply with Implementing Regulation (EU) 2018/1975[16].

The planning minima at destination alternates were also amended to transition from precision/non-precision approaches to type A/type B approaches, which simplified the AMC.

EASA also accepted that helicopter operators could comply with the IRs with no destination alternate, when flying to an aerodrome with two independent approaches and additional weather margins. A runway ensures that there will always be landing options available to the helicopter even if the runway itself is occupied. It also ensures, under point CAT.OP.MPA.110, that the highest minima will be 1000 m at destination. In this case, the planning minima at such a destination would include a 400-ft ceiling margin and a 2000-m visibility margin.

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

The current GM1 CAT.OP.MPA.181 'Selection of aerodromes and operating sites — helicopters LANDING FORECAST' is deleted. The new GM1 CAT.OP.MPA.192(c)&(d) is the renumbered, changed in its title, and further amended GM1 CAT.OP.MPA.181.

GM2 CAT.OP.MPA.192(c)&(d) 'Selection of aerodromes and operating sites — helicopters PROVISION OF SUPPLEMENTARY METEOROLOGICAL INFORMATION USING DIGITAL IMAGERY' (new)

This GM supports the above GM1 CAT.OP.MPA.192(c)&(d) by describing how operators can ensure that non-Part-MET-certified information, such as digital imagery, is reliable.

AMC1 CAT.OP.MPA.192(d) 'Selection of aerodromes and operating sites — helicopters PBN OPERATIONS' (new)

This new AMC includes the slightly amended content of the current AMC1 CAT.OP.MPA.182 'Destination aerodromes — instrument approach operations PBN OPERATIONS'.

GM1 to AMC1 CAT.OP.MPA.192(d) 'Selection of aerodromes and operating sites — helicopters INTENT OF AMC1 — PBN OPERATIONS' (new)

This GM includes the content of the current GM1 CAT.OP.MPA.182 'Destination aerodromes — instrument approach operations INTENT OF AMC1', which is renumbered as GM1 to AMC1 CAT.OP.MPA.182(f).

[16] Commission Implementing Regulation (EU) 2018/1975 of 14 December 2018 amending Regulation (EU) No 965/2012 as regards air operations requirements for sailplanes and electronic flight bags (OJ L 326, 20.12.2018, p. 53) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1580912849726&uri=CELEX:32018R1975)

Point CAT.OP.MPA.195 'Fuel/energy scheme — in-flight fuel/energy management policy — helicopters (replaced)

It contains the amended text of the current point CAT.OP.MPA.281 'In-flight fuel management — helicopters', which is deleted. New points are added to ensure harmonisation with ICAO regarding the 'MINIMUM FUEL' and 'MAYDAY MAYDAY MAYDAY FUEL' declarations.

AMC1 CAT.OP.MPA.195 'Fuel scheme — in-flight fuel/energy management policy — helicopters COMPLEX MOTOR-POWERED HELICOPTERS, OTHER THAN LOCAL OPERATIONS' (new)

It contains the slightly amended text of the current AMC1 CAT.OP.MPA.281 'In-flight fuel management — helicopters', which is deleted. The text of the current AMC1 CAT.OP.MPA.195 is moved to the new AMC1 CAT.OP.MPA.200 for aeroplanes and new AMC2 CAT.OP.MPA.200 for helicopters.

GM1 CAT.OP.MPA.195 'Fuel/energy scheme — in-flight fuel/energy management policy — helicopters' (new) — 'MINIMUM FUEL' DECLARATION — SAFE LANDING — FRF PROTECTION

This GM introduces further guidance on FRF protection and 'MINIMUM FUEL' and 'MAYDAY MAYDAY MAYDAY FUEL' declarations. The guidance on declarations is harmonised to the greatest possible extent with aeroplanes, as well as across Part-CAT, Part-NCC, Part-NCO, and Part-SPO, to improve the understanding of those declarations by air traffic controllers (ATCOs).

Point CAT.OP.MPA.200 'Special refuelling or defuelling of the aircraft' (new)

This is a new IR for special refuelling and defuelling.

With regard to helicopter operations, its scope includes:

— helicopter refuelling with rotors turning, as explained in Section 2.1.2.1. Only minor changes were introduced following the NPA 2016-06 (B) consultation; however, parts of the IRs that were proposed in NPA 2016-06 (B) were moved to AMC.

— refuelling and defueling with passengers on board, embarking and disembarking: the content of the current point CAT.OP.MPA.195 is moved to AMC5 CAT.OP.MPA.200, and only minor changes were introduced following the NPA 2016-06 (B) consultation;

— refuelling and defueling with wide-cut fuel: the content of the current point CAT.OP.MPA.200 is introduced in point (b)(3), and incorporated into the new AMC8 CAT.OP.MPA.200.

For helicopters, a specific approval is required only for refuelling with rotors turning, as proposed in NPA 2016-06 (B).

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

This is a new AMC for refuelling with rotors turning, as explained in Section 2.1.2.1. Only minor changes were introduced following the NPA 2016-06 (B) consultation.

A reference to point ORO.GEN.205 was proposed in NPA 2016-06 (B), but was deleted from this AMC, as well as from the equivalent NCC and SPO AMC, because it was a duplication of existing material. It made no difference to the related IRs and added no value.

However, it is reminded that when refuelling procedures rely on aerodrome/heliport services, point ORO.GEN.205 applies. As soon as operators apply point ORO.GEN.205, they only need to additionally

define the procedures and training programmes of their own staff, as described in this AMC and GM1 CAT.OP.MPA.200.

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

This is a new AMC for refuelling with rotors turning, as explained in Section 2.1.2.1. Only minor changes were introduced following the NPA 2016-06 (B) consultation.

GM2 CAT.OP.MPA.200 'Special refueling or defueling of the aircraft — RISK ASSESSMENT FOR REFUELLING WITH THE ENGINE(S) AND/OR ROTORS STOPPED — HELICOPTERS' (new)

This is a new GM for refuelling with rotors stopped, as explained in Section 2.1.2.1. Only minor changes were introduced following the NPA 2016-06 (B) consultation.

AMC5 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft — REFUELLING OR DEFUELLING WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING (new)'

This is a new AMC that includes the current point CAT.OP.MPA.195.

AMC7 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft — OPERATIONAL PROCEDURES FOR REFUELLING WITH PASSENGERS DISEMBARKING OR EMBARKING — HELICOPTERS WITH ENGINE(S) AND ROTORS STOPPED (new)'

This is a new AMC for refuelling with passengers disembarking or embarking, as explained in Section 2.1.2.1. Only minor changes were introduced following the NPA 2016-06 (B) consultation.

AMC8 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft —REFUELLING/DEFUELLING WITH WIDE-CUT FUEL (new)'

This is a new AMC that includes the current point CAT.OP.MPA.200.

GM2 CAT.OP.MPA.200 'Special refuelling or defueling of the aircraft — PROCEDURES FOR REFUELLING/DEFUELLING WITH WIDE-CUT FUEL (new)'

This new GM is identical to the current GM1 CAT.OP.MPA.200, which is deleted. These changes reflect the changes in the structure of the IRs.

Point CAT.OP.MPA.281 'In-flight fuel management — helicopters' (deleted)

Its content is moved to the new point CAT.OP.MPA.195 and amended.

AMC1 CAT.OP.MPA.281 'In-flight fuel management — helicopters COMPLEX MOTOR-POWERED HELICOPTERS, OTHER THAN LOCAL OPERATIONS' (deleted)

The content of this AMC is moved to the new AMC1 CAT.OP.MPA.195 and amended.

Correction of an editorial error in point SPO.IDE.H.146(a)(1)

Stakeholders notified EASA of an editorial error in point SPO.IDE.H.146 (a)(1), published in Commission Regulation (EU) 2019/1387, where the word 'not' was omitted by mistake. The scope of point SPO.IDE.H.145 and of the recently introduced point SPO.IDE.H.146, when read together, should be understood as follows: if a helicopter is within the scope of point SPO.IDE.H.145 (a), it is required to carry a flight data recorder, therefore point SPO.IDE.H.146 (a) should not require the carriage of another flight recorder on top of the one already mandated by point SPO.IDE.H.145. The new point

SPO.IDE.H.146 is intended to cover categories of helicopters that are *not* within the scope of point SPO.IDE.H.145. As the word 'not' is missing in point SPO.IDE.H.146 (a)(1), the purpose of the new rule is confusing.

Therefore, its text is amended by reintroducing the word 'not', as it was correctly published in NPA 2017-03. Finally, the amended point SPO.IDE.H.146 (a)(1) should read as follows:

'*(a) Turbine-engined helicopters with an MCTOM of 2 250 kg or more shall be equipped with a flight recorder if all the following conditions are met:*

*(1) they are **not** within the scope of point SPO.IDE.H.145(a);*

(…)'.

2.3.2.4 Overview of changes to Part-NCC, Part-NCO, and Part-SPO non-commercial operations with aeroplanes and helicopters

The objective of the amendments proposed to Part-NCC, Part-NCO, and Part-SPO operations with aeroplanes and helicopters is to improve consistency with the ICAO SARPs as well as across all Annexes to the Air OPS Regulation.

RG RMT.0573 reviewed the proposed amendments to the rules for non-commercial operations (both with complex and non-complex aeroplanes and helicopters), and amended further the draft rule text of NPA 2016-06 (C).

Changes to Part-NCC

In NPA 2016-06 (C), the fuel planning policy for NCC operators was replaced by detailed criteria equivalent to the basic fuel scheme introduced in Part-CAT, which was also largely consistent with the requirements of ICAO Annex 6, Part II, Chapter 3.4.3.5.

Point NCC.OP.105 is amended to be consistent with a change to Part-CAT. A pilot-in-command should not consider an aerodrome as isolated if sufficient fuel is carried to reach a weather-permissible destination alternate aerodrome.

Points NCC.OP.130 and NCC.OP.131 are deleted and replaced by a requirement in the new points NCC.OP.130 and NCC.OP.131.

The policy for destination alternate aerodromes is maintained as it significantly differs from the Part-CAT scheme for destination alternate aerodromes.

The FRF values are kept at IR level.

The in-flight fuel management requirements of ICAO Annex 6, Part II, Chapter 3.4.3.6 are incorporated into Part-NCC:

— point NCC.OP.205 is amended to be harmonised with Part-CAT and Part-NCO;

— point NCC.OP.205(b) is amended to be consistent with Part-CAT and Part-NCO, now referring to 'final reserve fuel (FRF)'; and

— points NCC.OP.205 (c) and (d) are added to introduce the 'MINIMUM FUEL' and 'MAYDAY MAYDAY MAYDAY FUEL' broadcasts.

These requirements were thus made consistent with the comparable requirements of Part-CAT.

Changes to AMC & GM to Part-NCC

AMC1 NCC.OP.131 is based on the Part-CAT basic fuel scheme. The GM for the basic fuel scheme is also based on Part-CAT. Section 2.3.2.1 of this Opinion on changes to Part-CAT details the 'basic fuel scheme'.

The requirements for in-flight fuel management were amended to be harmonised with the respective ICAO requirements.

Changes to Part-NCO

The current points NCO.OP.125 (b) and (c), as well as points NCO.OP.126 (b) and (c), are moved from IR to AMC level.

The new point NCO.OP.125 (b) introduces the concept of FRF. It also provides for some risk management factors that should be considered to determine a reasonable FRF, replacing the current prescriptive values of points NCO.OP.125 (a) and NCO.OP.126 (a). Points NCO.SPEC.135 and NCO.SPEC.140 are no longer needed and are therefore deleted. Further guidance is included in the new GM1 NCO.OP.125(b).

Point NCO.OP.125 (c) contains the same calculations of preflight fuel as the current point NCO.OP.125 (a), but with no specific numbers for FRF. It is therefore much simpler. Point NCO.OP.126 is therefore deleted. New related AMC & GM are also created for aeroplanes and helicopters.

The amended point NCO.OP.185 'In-flight fuel/energy management' reflects the ICAO Annex 6, Part II, Chapter 2.2.4.7 standards on in-flight fuel management.

The amendments to Part-NCO are designed to allow a total system approach, and are complementary to the requirements of ICAO Doc 4444 'PANS-ATM'. However, Part-NCO applies to flights that ATC does not control; in many circumstances, the commander may not even be in contact with the ATS. Therefore, the requirements for 'MINIMUM FUEL' and 'MAYDAY MAYDAY MAYDAY FUEL' broadcasts are mandatory for controlled flights only (flights subject to an ATC clearance), and optional for uncontrolled flights (see further clarifications in the related GM).

Changes to AMC & GM to Part-NCO

The new AMC1 NCO.OP.125(b) introduces default FRF quantities. Point NCO.GEN.101 establishes the right of an NCO operator to use alternative means of compliance (AltMoC) without any other conditions or obligations for notification or approval. Thus, if after consideration of the risk management factors of point NCO.OP.125 (b), the pilot-in-command considers that a lower FRF quantity than the one set out in AMC1 NCO.OP.125(b) is appropriate, the pilot-in-command is at liberty to plan a lower quantity.

The new AMC2 NCO.OP.125(b) clarifies that the FRF quantity should be selected before flight, and be an easily recalled quantity (e.g. one fourth of a tank or 50 l). The new GM1 NCO.OP.125(b) further explains the FRF concept.

The new AMC1 NCO.OP.125(c) covers in-flight fuel replanning. Point NCO.OP.125 (c) is deleted and reintroduced as AMC1 NCO.OP.125(c), as the intention of EASA is to indicate acceptable means of compliance with the IR through in-flight fuel replanning.

The new GM1 NCO.OP.185(b)&(c) sets out that the pilot-in-command should consider advising the ATC about the remaining endurance when making a 'MINIMUM FUEL' or 'MAYDAY MAYDAY MAYDAY FUEL' broadcast, as the ATC may be more familiar with CAT operations where the FRF is typically sufficient for a 30-minute operation. This GM also clarifies further the meaning of a 'MINIMUM FUEL' broadcast.

2.4. What are the stakeholders' views — outcome of the consultation

EASA received a total of 343 comments to the three sub-NPAs, 2016-06 (A), (B), and (C), from 41 commentators ranging from NAAs to commercial and private operators, airline associations, helicopter associations, pilot associations, aerodrome associations, FD associations, aircraft manufacturers, equipment manufacturers, and private individuals.

Detailed responses to the comments received as well as an analysis of the comments are provided in the related three CRDs (see Chapter 4 of this Opinion), each one addressing one of the sub-NPAs:

— CRD 2016-06 (A) addressing the comments received on sub-NPA 2016-06 (A) — CAT aeroplanes;

— CRD 2016-06 (B), addressing the comments received on sub-NPA 2016-06 (B) — CAT, SPA, NCC, NCO, and SPO helicopters; and

— CRD 2016-06 (C), addressing the comments received on sub-NPA 2016-06 (C) — NCC, NCO, and SPO aeroplanes and helicopters.

2.4.1. Outcome of the consultation on Part-CAT aeroplanes (NPA 2016-06 (A))

203 comments from 27 commentators were received on the new rules for CAT aeroplanes, which were proposed by sub-NPA 2016-06 (A).

For individual responses to the comments and more detailed conclusions, please consult CRD 2016-06 (A).

2.4.2. Outcome of the consultation on Part-CAT, Part-SPA, Part-NCC, Part-NCO, and Part-SPO helicopter operations (NPA 2016-06 (B))

EASA received 93 comments on sub-NPA 2016-06 (B) for CAT, NCC, NCO, and SPO helicopter operations.

For individual responses to the comments and more detailed conclusions, please consult CRD 2016-06 (B).

2.4.3. Outcome of the consultation on Part-NCC, Part-NCO, and Part-SPO aeroplanes and helicopters (NPA 2016-06 (C))

47 comments from 13 commentators were received on NPA 2016-06 (C) for non-commercial operations. The comments generally supported the proposed changes to Part-NCC, Part-NCO, and Part-SPO towards a more proportionate regime.

For individual responses to the comments and more detailed conclusions, please consult CRD 2016-06 (C).

2.5. What are the expected benefits and drawbacks of the proposals

The benefits for CAT aeroplanes are:

— fuel efficiency following a performance-based approach, depending on the capability of the operator and of the competent authority;

— clarity of rules;

— better in-flight fuel management;

— safety improvement; and

— harmonisation with ICAO.

Additional responsibilities (expected drawbacks) are:

— increased complexity for competent authorities in assessing the individual fuel schemes; and

— increased complexity for operators in collecting and analysing fuel data for individual fuel schemes or basic fuel schemes with variations.

2.6. How we monitor and evaluate the rules

The following table provides a list of indicators to support EASA in monitoring and carrying out ex post evaluation of rules on CAT aeroplane operations.

Indicator	Frequency	How to monitor
Fuel-related safety events	Annually	Via standardisation inspections by CAAs
Number of operators requesting approval of individual fuel schemes	Annually	Via standardisation inspections by CAAs
Number of diversions after a go-around at destination	Annually	Via standardisation inspections by CAAs
Number of flights without an alternate aerodrome	Annually	Via standardisation inspections by CAAs
Number of 'MINIMUM FUEL' declarations	Annually	Via standardisation inspections by CAAs
Number of 'MAYDAY MAYDAY MAYDAY FUEL' emergency calls	Annually	Via standardisation inspections by CAAs
Authorities'/organisations' requests for, and EASA opinion on, exemptions/derogations based on Articles 70 and 71 of the Basic Regulation (flexibility provisions)	Annually	Via an internal EASA database
Number of AltMoC used for fuel schemes	Annually	Via an internal EASA database

In addition, monitoring will be performed by collecting and analysing data from different sources through several available tools (developed in the context of safety promotion activities).

The new fuel rules will be subject to ex post evaluation that indicates how well the amended rules have been performing, also taking into account the predictions made in the RIA.

For helicopter operations: fuel exhaustion events and events related to refuelling with rotors turning, as well as their circumstances, will be monitored, and those circumstances will be assessed through the European Central Repository (ECR) for accident and incident reports in aviation.

For non-commercial operations: GA fuel exhaustion events will be monitored, and their circumstances assessed, through the European Central Repository (ECR) for accident and incident reports in aviation.

Cologne, 8 October 2020

Patrick KY
Executive Director

3. References

3.1. Related regulations

Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EU) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1)

3.2. Related decisions

— Decision N° 2012/015/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Guidance Material to Annex I — Definitions'

— Decision 2014/025/R of the Executive Director of the Agency of 28 July 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Regulation (EU) No 965/2012 and repealing Decision 2014/014/R of the Executive Director of the Agency of 24 April 2014 'AMC and GM to Part-ARO — Issue 3'

— Decision 2014/017/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ORO of Regulation (EU) No 965/2012 and repealing Decision 2012/017/R of the Executive Director of the Agency of 24 October 2012 'AMC and GM to Part-ORO — Issue 2'

— Decision 2014/015/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-CAT of Regulation (EU) No 965/2012 and repealing Decision 2012/018/R of the Executive Director of the Agency of 24 October 2012 'AMC and GM to Part-CAT — Issue 2'

— Decision N° 2012/019/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Acceptable Means of Compliance and Guidance Material to Part-SPA'

— Decision N° 2013/021/Directorate R of the Executive Director of the Agency of 23 August 2013 on adopting Acceptable Means of Compliance and Guidance Material for Non-commercial operations with complex motor-powered aircraft (Part-NCC)

— Decision 2014/016/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-NCO of Regulation (EU) No 965/2012 and repealing Decision 2013/022/R of the Executive Director of the Agency of 23 August 2013 'AMC and GM to Part-NCO — Issue 2'

— Decision 2014/018/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-SPO of Regulation (EU) No 965/2012 'AMC and GM to Part-SPO'

— Decision No. 2003/12/RM of the Executive Director of the Agency of 5 November 2003 on general acceptable means of compliance for airworthiness of products, parts and appliances ('AMC-20')

3.3. Other reference documents

— ICAO Annex 6 to the Convention on International Civil Aviation 'Operation of Aircraft', Part I, International Commercial Air Transport — Aeroplanes, 10th edition, July 2016, Amendment 41

— ICAO Doc 9976 'Flight Planning and Fuel Management (FPFM) Manual', 1st edition, 2015

— ICAO Doc 4444, 'Procedures for Air Navigation Services —Air Traffic Management', 16th edition, 2-16

— ICAO Circular 303-AN/176 'Operational Opportunities to Minimize Fuel Use and Reduce Emissions', February 2003

— EASA SIB 2018-08 'In-Flight Fuel Management — Phraseology for Fuel-Related Messages between Pilots and Air Traffic Control', 8 May 2018

— EASA SIB 2014-16 'Aeroplane Refuelling with One Engine Running', 23 May 2014, corrected 1 July 2014

— EASA SIB 2014-20 'Aeroplane Operations in Crosswind Conditions', 23 June 2014

— Safety Recommendation FRAN-2012-026, Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (BEA)

4. Related documents

As explained in Section 1.1. of this Opinion, the related CRDs 2016-06 (A), (B), and (C) will be published at a later stage.