Notice of Proposed Amendment 2016-06 (A)

Fuel planning and management

Sub-NPA (A) 'Aeroplanes — Annex I (Definitions), Part-ARO, Part-CAT'

RMT.0573 — 15.7.2016

EXECUTIVE SUMMARY

This sub-Notice of Proposed Amendment (sub-NPA) follows a performance-based approach by updating the regulatory requirements for fuel planning, selection of aerodromes and in-flight fuel management.

Safety is the main driver: safety recommendation FRAN-2012-026 (BEA) is directly addressed by this sub-NPA, but there are also other numerous serious incidents that were considered, including the one that occurred in Valencia, Spain in 2012.

The aim of this NPA is to:

— provide a comprehensive and updated set of safety requirements for developing and overseeing operators' fuel schemes, by addressing the identified gaps with regard to the in-flight fuel management policy;

— enable European operators to take advantage of the latest technologies and the effectiveness of their management system when developing and managing their fuel schemes; and

— increase operational efficiency, thereby having cost and environmental benefits.

Through this sub-NPA, the European Aviation Safety Agency (EASA) also ensures adherence to the International Civil Aviation Organization (ICAO) after the adoption of Amendment 36 and 38 to ICAO Annex 6, Part I, where ICAO recognised the need for amending and updating the fuel and alternate-aerodrome-selection requirements, many of which have remained unchanged since their adoption in the 1950s.

This sub-NPA is part of a set of three sub-NPAs as follows:

Sub-NPA 2016-06 (A): Aeroplanes — Annex I (Definitions), Part-ARO & Part-CAT

Sub-NPA 2016-06 (B): Helicopters — Annex I (Definitions), Part-CAT, Part-SPA, Part-NCC, Part-NCO & Part-SPO

Sub-NPA 2016-06 (C): Aeroplanes/helicopters — Part-NCC, Part-SPO & Part-NCO

Applicability		Process map	
Affected regulations and decisions:	— Annex I (Definitions); — Annex II (Part-ARO);and — Annex IV (Part-CAT) to Regulation (EU) No 965/2012; — ED Decision 2012/015/R; — ED Decision 2014/014/R; — ED Decision 2014/017/R; — ED Decision 2014/015/R	Terms of Reference (ToR), Issue 1:	27.4.2015
		Concept paper (CP):	No
		Rulemaking group (RMG):	Yes
		Regulatory impact assessemnt (RIA) type:	Light
		Technical consultation during NPA drafting:	Yes
		NPA consultation duration:	4 months
Affected stakeholders:	Flight crew; air operators; national aviation authorities (NAAs)	Review group (RG):	Yes
		Focused consultation:	Yes
Driver/origin:	Level playing field	Opinion expected publication in:	2017/Q3
Reference:	Safety Recommendation FRAN-2012-026 (BEA)	Decision expected publication in:	2018/Q4

Table of contents

1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this sub-NPA in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's 5-year Rulemaking Programme under RMT.0573.

The text of this sub-NPA has been developed by: the Agency[3] based on the input of RMG RMT.0573[4], in which representatives of the following organisations participated:

— Direction Générale de l'Aviation Civile (DGAC) France[5],

— Luftfahrt Bundesamt (LBA) Germany;

— Association of European Airlines (AEA)[6];

— International Air Transport Association (IATA)[7] ;

— Direction Générale de l'Aviation Civile (DGAC) Spain[8];

— European Low Fares Airline Association (ELFAA);

— European Cockpit Association (ECA); and

— Europe Air Sports (EAS).

In addition, this sub-NPA had as a proof of concept two different focused consultations, in the context of which the number of participants in this RMT was increased, and competent authorities (CAs) of the EU were coupled with the respective operators under those CA's oversight. This was done in order for the Agency to receive feedback from each CA and its operator. One focused consultation was held in Paris in January 2016, where DGAC France and Air France were consulted, and another one in London in April 2016, where not only the Civil Aviation Authority (CAA) UK together with British Airways and Virgin Atlantic were consulted but also other European airlines (e.g. Iberia and Koninklijke Luchtvaart Maatschappij (KLM)). This sub-NPA is hereby submitted for consultation of all interested parties[9].

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's 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 the Agency for the issuing of opinions, certification specifications and guidance material.

3 The Agency contributed to RMG RMT.0573 mainly by developing the concept of fuel schemes.

4 RMG Composition available at https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-rmt0573

5 Main contributor to authority requirements.

6 Vice-chair and main contributor to the selection of alternates aerodromes (Air France).

7 Main contributor to fuel planning (British Airways).

8 Main contributor to taxi fuel and contingency fuel (Vueling).

9 In accordance with Article 52 of the Basic Regulation and Articles 6(3) and 7 of the Rulemaking Procedure.

The process map on the title page contains the major milestones of this rulemaking activity to date and provides an outlook of the timescales of the next steps.

1.2. The structure of this NPA and related documents

Chapter 1 of this sub-NPA contains the procedural information related to this task. Chapter 2 (Explanatory Note) explains the core technical content. Chapter 3 contains the proposed text for the new requirements. Chapter 4 contains the RIA showing which options were considered and what impacts were identified, thereby providing the detailed justification for this sub-NPA.

1.3. How to comment on this NPA

Please submit your comments using the automated **comment-response tool (CRT)** available at http://hub.easa.europa.eu/crt/[10].

The deadline for submission of comments is **15 November 2016.**

1.4. The next steps in the procedure

Following the closing of the sub-NPA public consultation period, the Agency will review all comments. The outcome of the sub-NPA public consultation will be reflected in a comment-response document (CRD).

The Agency will publish the CRD concurrently with the Opinion.

Based on the outcome of the sub-NPA public consultation, the Opinion will contain the proposed amendments to Regulation (EU) No 965/2012[11] (hereinafter referred to as the 'Air OPS Regulation'), and will be submitted to the European Commission to be used as a technical basis in order to prepare a European Union (EU) Regulation.

Following the adoption of the Regulation, the Agency will issue a Decision containing the related acceptable means of compliance (AMC)/guidance material (GM).

[10] In case of technical problems, please contact the CRT webmaster (crt@easa.europa.eu).

[11] 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).

2. Explanatory Note

This sub-NPA introduces a new concept ('fuel schemes') for commercial air transport (CAT) aeroplanes into Annex IV (Part CAT) to the Air OPS Regulation.

The various requirements related to 'fuel schemes' were spread across CAT.OP.MPA[12], therefore, it made sense to group them together in consecutive implementing rules (IRs), as follows:

— CAT.OP.MPA.180 Fuel schemes — General;

— CAT.OP.MPA.181 Fuel planning;

— CAT.OP.MPA.183 Selection of aerodromes; and

— CAT.OP.MPA.185 In-flight fuel management.

The new proposal encompasses the old:

— fuel policy (CAT.OP.MPA.150);

— selection of aerodromes and planning minima (CAT.OP.MPA.180 and CAT.OP.MPA.185); and

— in-flight fuel policy (CAT.OP.MPA.280).

While the concept of 'fuel schemes' was not extended to cover also CAT helicopters (see related sub-NPA (B)), RMG RMT.0573 were of the opinion that it would be appropriate to follow the same approach already proposed for CAT aeroplanes, and move all fuel-related requirements to a consecutive set of IRs: CAT.OP.MPA.150 to CAT.OP.MPA.154.

2.1. Overview of the issues to be addressed

The concept of 'fuel scheme'

The introduction of ICAO Standards and Recommended Practices (SARPS) 4.3.4.4[13] and 4.3.6.6[14] to Amendment 38 to ICAO Annex 6, Part I, followed by ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015), was the starting point to initiate the discussion.

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[12] Annex IV 'COMMERCIAL AIR TRANSPORT OPERATIONS' [Part-CAT], Subpart B 'OPERATING PROCEDURES' [OP], Section 1 'Motor-powered aircraft' [MPA] to the Air OPS Regulation.

[13] *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.

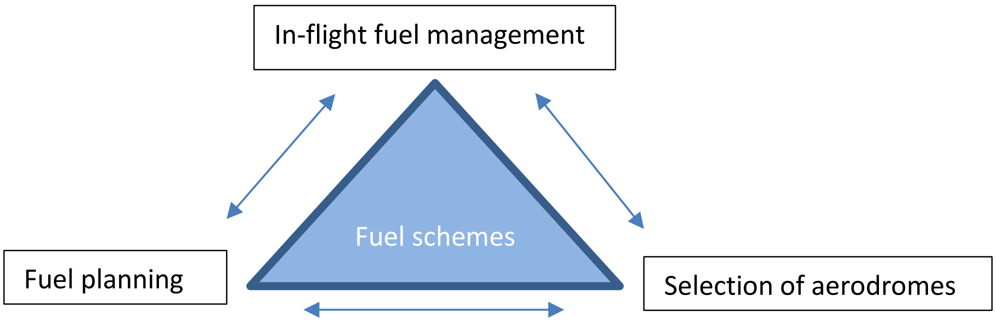
[14] *Notwithstanding the provisions of 4.3.6.3 a), b), c), d) and f), the State of the Operator may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve variations to the pre-flight fuel 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

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



— Combination of 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 (…).*

The RMG agreed with the ICAO approach.

— Combination of the in-flight fuel management with the preflight fuel calculation and selection of aerodromes

The RMG acknowledged the combination between the in-flight fuel management and the two above-mentioned policies although ICAO did not explicitly took 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 choice. The study showed that for all the reviewed events, when the outcome was successful, this was due to the effective in-flight fuel management policy applied by the flight crew and due to the operational control capabilities of the operators (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 a poor fuel planning and/or a poor selection of aerodromes will be borne during flight where the situation will need to be handled accordingly applying the in-flight fuel management policy;
- a good flight planning alone does not guarantee a safe outcome unless there is also a proper in-flight fuel management; the same principle applies to the selection of aerodromes;

(2) the advanced use of alternate aerodromes; and
(c) specific mitigation measures.

- the combination of a good fuel planning policy and poor in-flight fuel management policy may develop to an unsafe fuel situation (e.g. fuel emergency, minimum fuel or similar);
- conversely, a poor flight planning will probably have a safe outcome when proper in-flight fuel management is applied (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 'fuel scheme' will require prior approval by the CA , as does currently the fuel policy (CAT.OP.MPA.150), and it will integrate the fuel planning policy with the selection of aerodromes policy and the in-flight fuel management policy (see new CAT.OP.MPA.180).

Following a performance-based approach, the regulatory package will be composed of a set of:

— implementing rules (IRs) where the safety objective is defined; and

— acceptable means of compliance (AMC) that provide two different ways to meet the safety objective: a basic scheme and an individual scheme; the basic scheme provides a similar approach to the current prescriptive environment while the individual fuel scheme allows an increased efficiency and flexibility depending on the maturity of the operator and of the CA.

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

2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of these objectives by addressing the issues outlined in Chapter 2 of this sub-NPA.

The specific objectives of this proposal are, therefore, to:

(a) maintain the high aviation safety level by:

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

(2) transposing the content of SIB No 2013-12 to the applicable rules of the Air OPS Regulation; and

(3) transposing the content of SIB No 2014-16 to the applicable rules of the Air OPS Regulation;

(b) remain in compliance with ICAO SARPS by ensuring that the EU regulatory material complies with the latest amendments to ICAO Annex 6, Part I, Part II and Part III regarding fuel planning and in-flight fuel management; and

(c) issue an efficient Opinion to the European Commission by:

(1) clarifying the current applicable rules regarding fuel planning, fuel refuelling procedures and in-flight fuel management;

(2) ensuring consistency of fuel-related rules across all applicable Annexes of Air OPS Regulation for motor-powered aircraft, where appropriate;

(3) ensuring the correct balance between IR and AMC/GM on the subject issue; and

(4) ensuring, when possible, an adequate environmental protection.

2.3. Summary of the RIA

The RIA proposes 3 Options:

— 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 (PBRs) allowing to increase efficiency/flexibility with regard to fuel planning and management, depending on the maturity of the operator and CA.

Option 2 is the preferred one; the operator, depending on its maturity and the maturity of its CA, would have the choice to follow:

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

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

— individual fuel schemes, fully performance-based rules that allow an increase in efficiency/flexibility regarding fuel planning and selection of aerodromes, depending on the maturity of the operator and CA, with further potential reductions in fuel consumption compared to Options 0 and 1.

2.4. Overview of the proposed amendments

This Section provides specific explanation for some of the requirements/AMC/GM proposed in this NPA:

Definition	**Annex I (Definitions) to the Air OPS Regulation**
Alternate aerodrome	The general structure of the ICAO alternate-aerodrome definition was followed: ‘***Alternate aerodrome.*** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following: *Take-off alternate.* An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure. *En-route alternate.* An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route. *Destination alternate.* An alternate aerodrome at which an aircraft would

	be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing. *Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.*' The adequate aerodrome definition was maintained because it is a well-understood concept for European pilots and dispatchers. In addition, the extended-range twin operations (ETOPS) and extended diversion time operations (EDTO) documentation, once transposed, will also refer to adequate aerodromes.
Fuel en route alternate (ERA) aerodrome, for the purpose of additional fuel requirements	The introduction of the additional fuel requirements into fuel ERA was to limit the need for increased planning minima for the normal en route alternate. From now on, the weather minima are only required for the fuel ERA, and all other ERAs need to only fulfil the requirements for an adequate aerodrome.
Safe landing	The term 'safe landing' is currently used in the European regulations and at ICAO level. According to the new regulatory proposal, this term will be used more broadly and in particular in some of the most sensible requirements, such as those related to the FRF. Therefore, it was necessary to provide a definition even though ICAO Annex 6, Part I does not provide any. Nevertheless, the RMG managed to extract the main elements of what ICAO could understand by 'safe landing' after studying of ICAO Annex 6, Part I and ICAO Doc 9976. The European definition proposed in this NPA is to a considerable extend aligned with the understanding of ICAO, although it considers the fuel quantity while ICAO does not.
Requirement	**Annex II (Part-ARO) to the Air OPS Regulation** **ARO.OPS.225 Approval of fuel schemes**
ARO.OPS.225(b)	The proposed ARO.OPS.225(b) was drafted with the purpose to be considered, amongst others, in conjunction with ARO.GEN.300. Especially relevant are ARO.GEN.300(a) and ARO.GEN.300(b), as well as AMC1 ARO.GEN.300(a);(b);(c). **ARO.GEN.300 Oversight** (a) The competent authority shall verify: (1) compliance with the requirements applicable to organisations or type of operations prior to the issue of a certificate, approval or authorisation, as applicable; (2) continued compliance with the applicable requirements of organisations it has certified, specialised operations it has

	authorised and organisations from whom it received a declaration; (3) continued compliance with the applicable requirements of non-commercial operators of other-than complex motor-powered aircraft; and (4) implementation of appropriate safety measures mandated by the competent authority as defined in ARO.GEN.135(c) and (d). (b) This verification shall: (1) be supported by documentation specifically intended to provide personnel responsible for safety oversight with guidance to perform their functions; (2) provide the persons and organisations concerned with the results of safety oversight activity; (3) be based on audits and inspections, including ramp and unannounced inspections; and (4) provide the competent authority with the evidence needed in case further action is required, including the measures foreseen by ARO.GEN.350 and ARO.GEN.355. (…)
ARO.OPS.225(c)(3)	The word 'evaluate' is used in order to trigger or highlight the relevance of AMC2 ARO.GEN.300(a);(b);(c) — 'EVALUATION OF OPERATIONAL SAFETY RISK ASSESSMENT', to implement 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, the use of this safety risk assessment should trigger the application of: — ORO.GEN.200(a)(3) Management system; — AMC1 ORO.GEN.200(a)(3) Management system, COMPLEX OPERATORS — SAFETY RISK MANAGEMENT; and — GM3 ORO.GEN.200(a)(3) Management system, SAFETY RISK ASSESSMENT — RISK REGISTER.
AMC	**AMC1 ARO.OPS.225 Approval of fuel schemes** **OVERSIGHT — VERIFICATION OF COMPLIANCE**
AMC1 ARO.OPS.225(c)(1)	Management system: a functional management system is at the core of the individual fuel schemes.
AMC1 ARO.OPS.225(c)(5)	The RMG discussed weather fleet, type or variant was appropriate — fleet

	was the preferred option.
AMC1 ARO.OPS.225(c)(8)	In order to ensure a fully functional system to support the individual fuel scheme, it is of utmost importance that all personnel involved are properly trained. For that reason, AMC1 ARO.OPS.225(c)(7) was proposed. Nevertheless, the 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 the flight crew. It is indeed an important factor (experience of the personnel and flight crew) that the CA should consider when assessing the extend of the deviation proposed by the operator. For this purpose, GM1 ARO.OPS.225(c) Guidance for the inspectors recommends in addition the verification by qualified personnel of crew experience in the system used by the operator. *Note 1: in the context of informal learning/informal knowledge, negative training was also taken into consideration. ORO.GEN.200 Management system, which amongst others includes internal occurrence reporting schemes and compliance monitoring, should prevent the possibility of negative training.* *Note 2: nothing restricts the CA to provide an aggressive fuel scheme subject to an implementation plan with which the operator will comply internally in order to avoid administrative burden (e.g. to avoid several approvals over a period of 2 or 3 years as the fuel schemes become more aggressive) and therefore allow the operator's personnel to progressively acquire more experience.*
AMC1 ARO.OPS.225(e)	ARO.GEN.300(a)(2) requires that the CA verifies the continued compliance of the operator with the applicable requirement. This requirement is general and shall encompass all fuel schemes. AMC1 ARO.OPS.225 addresses the need to establish a specific process for the oversight over individual fuel schemes, which will ensure continued compliance. **ARO.GEN.300 Oversight** (a) The com**p**etent authority shall verify: (2) continued compliance with the applicable requirements of organisations it has certified, specialised operations it has authorised and organisations from whom it received a declaration; (…)

Requirement	**Annex IV (Part-CAT) to the Air OPS Regulation** **CAT.OP.MPA.106 Use of isolated aerodromes — aeroplanes**
	Deletion of CAT.OP.MPA.106. Following the proposed approach of integration in the CAT.OP.MPA.180 series all requirements related to fuel schemes, the content of CAT.OP.MPA.106 was moved to CAT.OP.MPA.183(c) and the corresponding AMC2 CAT.OP.MPA.183
GM	**GM1 CAT.OP.MPA.107 Adequate aerodrome**
	A GM is introduced to clarify the difference between 'adequate aerodrome' and 'weather-permissible aerodrome'. The two concepts are complementary: — 'adequate aerodrome': see CAT.OP.MPA.107; and — 'weather-permissible aerodrome' means adequate plus weather-permissible. As a reminder, a definition weather-permissible aerodrome is included in Annex I (Definitions) to the Air OPS Regulation: *'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.*
Requirement	**CAT.OP.MPA.180 Fuel schemes**
	This requirement introduces and explains the concept of 'fuel scheme'. This IR links fuel planning, with selection of alternates and in-flight fuel management. It also introduces the concept of individual fuel schemes in (d). The individual fuel schemes are intended for those operators that demonstrate certain capabilities, defined in (d)(2). These capabilities are further developed in AMC3 CAT.OP.MPA.180. The operator must also demonstrate an equivalent level of safety as described in (d)(1) and (d)(3), and further developed in AMC3.CAT.OP.MPA.180 and associated GM. The concept of individual fuel schemes follows a similar approach to that of the individual flight time specifications schemes already introduced by ORO.FTL in the Air OPS regulation. Although instead of using certification specifications (CS) (non-binding provisions), the fuel schemes will make use of only AMC/GM, and instead of being ultimately approved by the Agency, the individual fuel schemes will be entirely approved and controlled at

	national level (by the CA).
CAT.OP.MPA.180(c)(3)	The idea of baseline safety performance was originally proposed in ICAO Doc 9976 — please refer to 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. Clarification note: when an operator is approved using AMC3 CAT.OP.MPA.180 Individual fuel schemes as a means of compliance, and wishes to apply again for a new individual fuel scheme, the baseline that should be used will be established again using the current individual fuel scheme, and not the baseline established years before. Therefore, when moving to a more aggressive fuel scheme, the operator must use the safety performance of the current individual fuel scheme. The reason is that probably some of the safety performance indicators (SPIs) used in the current fuel scheme may not be appropriate for the new scheme. In other words, in the current fuel scheme, the SPIs chosen were meaningful but in the proposed new fuel scheme may not be meaningful; hence, a new baseline safety performance should be established. Moreover, the targets achieved in the current individual fuel scheme which were approved by the CA, may not be sufficient for the proposed new individual fuel scheme and, therefore, a better baseline safety performance must be achieved before approving the individual fuel scheme.
CAT.OP.MPA.180(d)(3)	The term used in this requirement is 'equivalent level of safety'. The RMG compared 'equivalent level of safety' against 'acceptable level of safety', deciding that 'equivalent level of safety' is the correct term in order to be able to establish a baseline. In addition, the Basic Regulation uses the term 'equivalent level of safety', and 'acceptable level of safety' is not used.
AMC	**AMC1 CAT.OP.MPA. 180 Fuel schemes**
Title 'BASIC'	The term 'basic' is used to allow the use of the word 'baseline' for the safety performance in accordance with ICAO Doc 9976.
AMC	**AMC3 CAT.OP.MPA. 180 Fuel schemes**
AMC3 CAT.OP.MPA.180 (b)(1)(ii) and GM1 CAT.OP.MPA.181(c)(b)(2)(ii)	The RMG discussed the possibility to create a GM in order to better explain what would be a reasonable number of data in the 2 year period, as it is not equivalent to fly once a month or once a day. Therefore, a GM explaining seasonal data and providing guidance on a minimum number of flights within the 2-year period could be developed (e.g. 100 flights as a minimum). Please submit your comments if a GM should be developed using CRT, as described in Section 1.3 above.
AMC3 CAT.OP.MPA.180	The content of this AMC was extracted from ICAO Doc 9976, 5.4.11. 'Core

(d)(3)	capability — Monitoring operational data collection and analysis’
AMC3 CAT.OP.MPA.180 (e)(1)	This AMC was created following ICAO Doc 9976 and is intended to provide accuracy as regards the preflight fuel calculation, taking into account meteorological conditions, wind prediction, etc. This is very important for a safe operation under individual fuel schemes. For that reason, (…) suitable computerised flight planning system (…) was inserted.
AMC3 CAT.OP.MPA.180 (e)(5)	This AMC ensures that more landing options are available. The Agency expects an extensive use of this system in the future (e.g. airports will use instrument landing system (ILS) and required navigation performance (RNP) applications only).
AMC3 CAT.OP.MPA.180 (e)(6)	The term ‘operational control system’ was introduced mirroring ORO.GEN.110(c) instead of using the ICAO terminology.
AMC3 CAT.OP.MPA.180 (e)(6)(ii)	Adequate meteorological information is very important for individual fuel schemes (please refer also to ICAO Doc 9976). Since the related requirement is provided under the operational control system, and flight crew is part of the system, this requirement in particular may be fulfilled by the crew only. Nevertheless, it lies with the CA to decide depending on the area of operation, workload of the crew etc. This AMC allows some flexibility, given the fact that not all the official meteorological offices provide qualitative and reliable terminal aerodrome forecasts (TAFs) and/or meteorological terminal aviation routine weather reports (METARs). The operator may subcontract external services to have a better picture of the reliability of the meteorological information, including the improvement of such information.
GM	**GM3 CAT.OP.MPA. 180 Fuel scheme**
Note	The note ‘For certain non-data-based monitoring SPIs, it is possible that alert and target levels may be qualitative in nature’ was introduced in the GM acknowledging that some SPIs can be qualitative in nature, and that the combination of data driven SPIs and qualitative SPIs would be beneficial; the latter is also supported by ICAO Doc 9976, 5.2.8.
Requirement	**CAT.OP.MPA.181 Fuel planning**
Deletion of: ‘(3) reserve fuel consisting of:’	In order to fully align with the terminology used in ICAO Annex 6, Part I, ‘reserve fuel’ was deleted since it is not used as such by ICAO (please refer to Annex 6, Part I, SARP 4.3.6.3.). However, the concept of ‘final reserve fuel’ is extensively used both in ICAO and the European regulatory system and, therefore, it was maintained. Apart from that, in the current Air OPS Regulation two very similar terms are

	used: 'reserve fuel' and 'final reserve fuel'. This similarity may create misunderstanding and confusion. *Note: a consistency check of the term 'reserve fuel' was performed across the Air OPS Regulation with no indication that the concept is used for CAT aeroplanes.*
CAT.OP.MPA.181(c)(4)	The addition of 'destination' before 'alternate fuel' was made to fully align with the terminology used in ICAO ('destination alternate fuel', as in ICAO Annex 6, Part I, SARP 4.3.6.3(d)).
CAT.OP.MPA.181(c)(4)(ii)	The additional 15-min fuel is transposed from the current AMC1 CAT.OP.MPA.150. In order to better align with ICAO Annex 6, Part I, said was moved to the implementing rule (IR) as a requirement. The safety objective of this requirement is the provision of additional fuel to compensate for the lack of a destination alternate aerodrome.
CAT.OP.MPA.181(c)(8)	A new type of fuel is introduced. 'Discretionary fuel' is only at the discretion of the pilot-in-command (PIC), for this fuel there is not necessarily a justification. On the other hand, the extra fuel is provided by the operator's personnel (e.g. operator control centre (OCC), flight dispatcher, PIC, etc.), and normally with a specific justification, for example the expected holding time at destination.
CAT.OP.MPA.181(d)	The in-flight replanning was originally part of the CAT.OP.MPA.150 fuel policy. Due to the renumbering of the requirements, the most logical place for in-flight replanning would be CAT.OP.MPA.181(d). However, the RMG discussed if weather and in-flight replanning could be better placed as an additional option in the in-flight fuel management. This question remains open and readers of this NPA are invited to comment thereon. Furthermore, the Agency has launched a survey on fuel in parallel to the development of this NPA. This survey includes the same question and will be considered by the Agency in order to take a decision.
AMC	**AMC2 CAT.OP.MPA.181 Fuel scheme — Fuel planning and in-flight replanning policy**
	For a good 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, for contingency fuel, 2-year data are required. For that reason, new operators do not qualify for existing variations.
AMC2 CAT.OP.MPA.181(b)	A fuel consumption monitoring system will be required for the 3 % ERA and the other contingency fuel variations. The feedback provided by the RMG is that in a 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 to less than 5 %. The principle of the proposed new CAT.OP.MPA.183(b) at IR level is the use of a fuel consumption monitoring programme (FCMP) as a first option. Only new operators will have to use the manufacture's data. This way, the FCMP will be fostered. According to ICAO, any other than 5 % contingency fuel is subject to 'variation'. That means in addition to the fuel consumption monitoring programme, a risk assessment should be performed and the other requirements of ICAO Annex 6, Part I, SARP 4.3.6.6 should be met. The variation proposed by AMC2 CAT.OP.MPA.181 (b) is an intermediate approach, where not all of 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 ton. If an operator plans to carry 5 ton of contingency fuel to the destination, an additional 2 ton of trip fuel may be needed to carry it; thus, on a 10-h flight, an operator could board 7 ton of fuel: 5 tons as 5 % contingency fuel plus 2 tons additional trip fuel to carry and protect the total amount of fuel all the way to the destination. In cases where the contingency fuel is not protected to the destination aerodrome, no adjustment is made to the trip fuel, and contingency fuel is simply added as a straight percentage of the trip fuel. The concept, of 'protected' and 'unprotected' contingency fuel, must be clearly understood as any given flight may have more or less (fuel) buffer when it does not unfold as originally planned. For the RMG, the unprotected contingency fuel is a means to demonstrate compliance with CAT.OP.MPA.181(c)(3). Nevertheless, the final decision still lies with the CA.
GM	**GM 1 CAT.OP.MPA 181 Fuel scheme — fuel planning and in-flight replanning policy**
COMPUTERISED FLIGHT PLANNING SYSTEM	The RMG studied the possibility of creating further guidance material in top of what is provided in this GM. Readers are invited to submit comments on this topic using CRT, as

	described in Section 1.3 above.
GM	**GM1 CAT.OP.MPA.181(b)(2)(ii) Fuel scheme — Fuel planning and in-flight replanning policy**
	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 th*at *fuel burn depends on the weight of the aircraft*, more aircraft weight leads to higher fuel consumption (approximately a 3 % difference of fuel burn per kg per h). The potential risk could be a departure with an underestimated fuel quantity based on a lower ZFW than the actual one. This risk can therefore be limited by the use of verification procedures usually implemented by the operators. As a matter of fact, industry practices show that fuel calculations adjustments in the operational flight plan (OFP) are generally carried out through additional data or tables in the operation manual. According to the data provided by the RMG, industry practices generally evaluate a ZFW based on the expected cargo and passenger weight which is usually overestimated. Statistically, this ZFW gradually decreases and stabilises just before the departure time. AMC3 ORO.MLR.100 Operations manual — general provides that the operator defines procedures and responsibilities for the preparation and acceptance of the operational flight plan which should include the verification of the fuel quantities. AMC3 ORO.MLR.100 Operations manual — general *(…)* *8.1.10 Operational flight plan. Procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan should be described including samples of the operational flight plan formats in use.* *(…)* The RMG estimated that the existing requirements of the Air OPS Regulation are sufficient to cover the verification of ZFW changes. The implementation by the operator of the OFP acceptance procedures may be subject to an assessment by the CA during flight preparation audits. However, clear limits beyond which a new operational flight plan 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 high importance because, when the final ZFW is received by the

	crew the time necessary to get a new OFP at this stage of the flight preparation is critical. Finally, the RMG believed that this GM should also cover the need to provide crews with practical tools to update the fuel quantity according to ZFW changes, and for that purpose, the following sentence was added: *(…) procedures should include means to revise fuel quantity (…).*
GM	**GM1 CAT.OP.MPA.181(b)(2)(iii) Fuel scheme — Fuel planning and in-flight replanning policy**
	The GM refers to systems that provide better meteorological information, similar to the Federal Aviation Administration (FAA)'s enhanced weather information (EWINS) — please refer to the following link: http://fsims.faa.gov/WDocs/8900.1/V03%20Tech%20Admin/Chapter%2026/03_026_004.htm
GM	**GM1 CAT.OP.MPA.181(c) Fuel scheme — Fuel planning and in-flight replanning policy**
GM1 CAT.OP.MPA.181(c) INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING PROGRAMME	The content of this GM was transposed from ICAO Doc 9976, Appendix 7 to Chapter 5 *'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.'*

GM	GM1 CAT.OP.MPA.181(c)(1) Fuel scheme — Fuel planning and in-flight replanning policy
GM1 CAT.OP.MPA.181(c)(1) Fuel scheme — Fuel planning and in-flight replanning policy BASIC FUEL SCHEME — TAXI FUEL — LOCAL CONDITIONS and GM1 CAT.OP.MPA.181(c)(3) Fuel scheme — Fuel planning and in-flight replanning policy CONTINGENCY FUEL AND UNFORESEEN FACTORS.	Over the years, it has been identified that 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 and to unfair competition, thus increasing risk in favour of lowering operational costs. To avoid arbitrary interpretation by EU operators leading to a reduction of safety margins, it has been decided to redefine the taxi and contingency fuel definitions as follows: Taxi fuel: according to AMC1 CAT.OP.MPA.181(c), 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'. The RMG agreed that local conditions should at least include: notice to airmen (NOTAM), meteorological conditions, air traffic services (ATS) procedures (e.g. low visibility procedures (LVP) Airport Collaborative Decision Making (CDM) etc.) and known delays. Contingency fuel: Amendment 38 to ICAO Annex 6, SARP 4.3.6.7 clarifies the use of contingency fuel during taxi. As per this new rule, the PIC should perform a reanalysis and, if applicable, an adjustment of the planned operation, and, if necessary, return to the parking position in order to refuel, should any delay result in the consumption of contingency fuel before take-off. Therefore, the RMG agreed to permit the use of contingency fuel during taxiing prior to take-off, if exceptional circumstances would result in unexpected ground delays. *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 (Doc 9976)*
GM	**GM1 CAT.OP.MPA.181(c)(2) Fuel scheme — fuel planning and in-flight replanning policy**
GM1 CAT.OP.MPA.181(c)(2)	'Point Merge' is a form of holding over destination which, in essence, is not different from other forms of holding like racetracks holding patterns or linear holding (e.g. trombone pattern). The condition for using contingency fuel for such calculations is the availability of relevant data, related to the average part of the Point Merge

	to be flown, and 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 allowing high levels of predictability regarding the sections of the linear holding on the Point Merge Arc which may be flown. In either case, these statistics will allow pilots to determine, in accordance with the expected time of arrival, the contingency/discretionary/extra fuel (as applicable) needed for safe flight completion. It is important to note, however, that ATS units implementing Point Merge standard terminal arrival routes (STARs) (or similar performance-based navigation (PBN) procedures) typically publish statistics showing the portion of the Point Merge Arc flown by arriving aircraft during various hourly bands of the day or the week. It is important to note, however, that operators lacking the requisite skills, expertise and knowledge to support SCF calculations or to otherwise predict the likelihood that an entire procedure will be flown may account for the entire flight plan track to the destination, including potential standard instrument departure (SID)/STAR combinations, in terms of trip fuel and discretionary fuel.
GM	**GM1 CAT.OP.MPA.181(c)(5) Fuel scheme — fuel planning and in-flight replanning policy**
GM1 CAT.OP.MPA.181(c)(5)	*The operator may determine a conservative (rounded up) final reserve fuel values for each type and variant of aeroplane used in operations.* The proposed text is extracted from ICAO Annex 6, Part I, 4.3.6.4. *Compliance with this ICAO recommendation would require an operator to determine conservative (rounded up) FRF values for each type and variant of aeroplane used in operations. The intent of this recommendation is twofold:* — *to provide a reference value in order to compare it to pre-flight fuel planning computations and for the purposes of a 'gross error' check; and* — *to provide flight crews with easily referenced and recallable FRF figures in order to assist in in-flight fuel monitoring and decision-making activities.* Explanatory note above extracted from ICAO Doc 9976.
Requirement	**CAT.OP.MPA.182 Fuel Schemes– Fuel planning and in-flight replanning policy**

	The RMG recommends to remove this requirement from the IR and introduce it as an AMC. Readers are invited to submit comments on this topic using CRT, as described in Section 1.3 above.
Requirement	**CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes**
	The intention of this requirement is to provide the safety objective that is covered by the current CAT.OP.MPA.180 and CAT.OP.MPA.185 since these requirements have been moved to AMC. The proposed new requirement CAT.OP.MPA.183(a) provides the general safety objective for all type of flights in CAT operations; this may include local flights (A–A), visual flight rules (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 CAT.OP.MPA.183(b)), etc. CAT.OP.MPA.183(a) 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: this requirement is provided by the 'safe landing' definition were more than the FRF is required; 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 CAT.OP.MPA.183 provides flexibility as regards the maximum distance to an adequate aerodrome, (*(…) an aerodrome where a safe landing can be made (…)*). This requirement does not regulate where these two landing options must be. The maximum distance to an adequate aerodrome (safety objective) is to be found in CAT.OP.MPA.140 or ETOPS; however, CAT.OP.MPA.183 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. CAT.OP.MPA.183(b) further specifies and restricts (a) with regard to IFR flights. When analysing the prescriptive requirements of CAT.OP.MPA.185 (equivalent to ICAO Annex 6, Part I), that there must be: — two alternates when the destination is below minima from 1 h before

	to 1 h after, hence, not available); — one alternate when the destination is available (same time periods); and — no alternates 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 available when reaching the destination. As the term 'reaching the destination' can be vague and subject to interpretation, GM1 CAT.OP.MPA.183(b) was created. The reason for inserting '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, CAT.OP.MPA.183(a) requires at least one landing option, while reaching the destination at the end of the flight (CAT.OP.MPA.183(b)) introduces two landing options for IFR flights. The introduction in the aforementioned (b) of the term 'safe landing when reaching the destination' means that there must be sufficient fuel to reach the destination and thereafter to proceed to the second landing option, but it do not necessarily mean fuel for a go-around; for example, a decision point close to the destination and not necessarily at the destination (hence, before the destination) may be selected at the flight planning stage. As per (a), the flight must be planned with one aerodrome available for a safe landing once the flight has commenced. This covers the case of a fuel ERA, take-off alternate and ETOPS alternate from a fuel quantity perspective, as well as emergency situations. As per (b), at the planning stage of a flight, two aerodromes must be available for a safe landing at the estimated arrival time at the destination or destination alternate. 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 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 <u>no alternate</u> 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 taxiing).
CAT.OP.MPA.183(b) 'ATS flight plan' term	The ATS flight plan may include in Item 18 the en route alternate (ERA and Fuel ERA).

	ICAO Doc 4444 'Procedures for Air Navigation Services — Air traffic Management' ITEM 18 — PANS ATM *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.*
CAT.OP.MPA.183(c)	The calculation of fuel when using an isolated-aerodrome requirement is in principle an alleviation. Therefore, instead of the following: '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 CAT.OP.MPA.183(c) Isolated aerodromes. The requirement contained in the current CAT.OP.MPA.106 allows the operator, under certain conditions (e.g. approval by the CA), to carry less fuel. Thus, 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 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 CAT.OP.MPA.150 or the proposed new CAT.OP.MPA.181. The Agency is of the opinion that the existing rule may create legal uncertainty in cases where 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.
CAT.OP.MPA.183(e) 'appropriate safety margins to flight planning'	For the RMG, 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 is to mitigate weather deviations from the ones originally forecasted and possible failures of the equipment used to fly the approach.
AMC	**AMC1 CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes**
Deletion of: 'The operator shall specify any required alternate aerodrome(s) in the operational flight plan' of	As explained above, the AMC proposed is a transposition of CAT.OP.MPA.180 but with the deletion of (d) based on the following: (a) for take-off alternate aerodromes, the requirement for specify them in the operational flight plan has been maintained in CAT.OP.MPA.183(e): *(…) the operator shall select and specify in the operational flight plan (…)*; and

CAT.OP.MPA.180.	(b) for destination alternate/s, the content of the requirement has been moved to AMC1 CAT.OP.MPA.183(b) and AMC1 CAT.OP.MPA.183(c): *(…) and specified it in the operational and ATS flight plan(…)*; this change was made to allow a dynamic selection of alternates for the individual flight schemes.
AMC1 CAT.OP.MPA.183(b)(2)	The RMG discussed this AMC against ICAO SARP 4.3.4.3.1 where an instrument approach is required, which is considered to be a more restrictive that the European rule. Having the requirement of 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 the destination not having an instrument approach). The European rule could be as restrictive as the ICAO SARP, however, the current data shows that the rule is safe.
AMC1 CAT.OP.MPA.183(d) Fuel scheme — selection of aerodromes policy — aeroplanes	This AMC allows to plan the take-off alternate without planning minima by using only operating minima (the planning minima table of AMC1 CAT.OP.MPA.183 is not applicable to take-off alternates). The commander needs to check the weather of the take-off alternate just before departure and in addition ensure the weather forecast from 1 h before to 1 h after the weather will be above minima, therefore the possible imprecision of the weather forecast is reduced (note: a safety margin of +- 1 h remains in the proposed AMC).
Table 1 — Planning minima	The proposed table will be revised by RMT 0379 All-weather operations, see ToR and concept paper in the following link: https://www.easa.europa.eu/document-library/rulemaking-subjects/all-weather-operations
AMC **GM**	**AMC2 CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes** **GM1 CAT.OP.MPA.183(c) Use of isolated aerodromes — aeroplanes**
AMC2 CAT.OP.MPA.183 (a)(1)(iv) and GM1 CAT.OP.MPA.183(c)	Normal fuel consumption: RMG RMT.0595[15] experts recommended to the Agency that the term 'normal fuel consumption' should be revised as it is not defined, which leads to an inconsistent use thereof. Furthermore, a focused consultation with one of the biggest flight planning service providers lead to the same conclusion — the provider has to adapt its system depending on the client and the authority overseeing the client. Following the objectives of ToR RMT.0573 Issue 1 'Fuel procedures and planning' and in line with Article 2(2)(f) of the Basic Regulation with regard

[15] ToR RMT.0595 — Technical review of theoretical knowledge syllabi, learning objectives, and examination procedures for the Air Transport Pilot Licence (ATPL), Multi-Crew Pilot Licence (MPL), Commercial Pilot Licence (CPL), and Instrument Rating (IR).

	to level playing field, RMG RMT.0573 decided to propose a new GM defining the term.
GM1 CAT.OP.MPA.183	The proposed GM is the existing GM1 CAT.OP.MPA.185.RMT0379 All weather operation will amend as appropriated in order to take into account operational credits. .
GM	**GM1 CAT.OP.MPA.183(b) Use of isolated aerodromes — aeroplanes**
GM1 CAT.OP.MPA.183(b) 'Reaching the destination'	This GM provides guidance on the term 'reaching the destination' of CAT.OP.MPA.183. The distance of 1 h was decided in line with CAT.OP.MPA.140. The discussion weather an AMC would be required instead is still open; depending on the comments and the outcome of the survey (see: https://ec.europa.eu/eusurvey/runner/FuelPlanning2015), the final text may be changed. The GM reference of 1 h is not intended for isolated aerodromes; in such cases, the Air OPS regulatory package provides guidance for the location of the decision point. 'Reaching the destination' in this case makes use of the decision point to explain the term. Finally, the RMG discussed the applicability of the GM in flights of less than 1 h. For the RMG, the GM is applicable to them. This means as soon as the aircraft take-off from the departure aerodrome the aircraft is reaching destination, this is acceptable, in such a flight the unforeseen circumstances after the flight has commence are less likely to occur (e.g. weather predictions 1 h ahead are more accurate than 12 h ahead).
Requirement	**CAT.OP.MPA.185 Fuel scheme — in-flight fuel management policy — aeroplanes**
	This requirement describes a coordinated escalation process with regard to the air traffic control (ATC) and the protection of the FRF. Although each situation is different and may be handled at any stage of the process, normally, this process should follow a three-step approach (note: the European approach follows the ICAO rationale as in ICAO Doc 9976): **Step 1** Request delay information when required (in accordance with: CAT.OP.MPA.185 (a) and ICAO Annex 6, Part I, SARP 4.3.7.2.1). **Step 2** Declare MINUMUM FUEL when committed to land at a specific aerodrome **and** any change in the existing clearance may result in a landing with less than planned final reserve fuel (in accordance with CAT.OP.MPA.185 (b) and ICAO Annex 6, Part I, SARP 4.3.7.2.2). **Step 3** Declare a fuel 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 final reserve fuel (in accordance with CAT.OP.MPa.185 (c)

	and ICAO Annex 6, Part I, SARP 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.
CAT.OP.MPA.185(a)(3)	The related ICAO standard mandates to request the ATC to for delay information. The current IR already prescribes that the commander must take into account the prevailing traffic and the operational conditions, without specifying how the commander obtains such information. The proposed amendment introduces the ICAO obligation to use the ATC as a source of information, while leaving the option to collect additional information through other sources (e.g. via the operator's system for exercising operational control). This additional requirement increases the range of information available to the commander in order to decide the best course of action when alternate fuel is being eroded. It is important to note that in-fight fuel management policies are not intended to replace preflight planning or in-flight replanning activities, but to act as controls to ensure 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.
CAT.OP.MPA.185(b)	The current IR needs to be updated to reflect the recent changes to ICAO Annex 6 and ICAO Doc 4444 Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM)' with regard to 'minimum fuel'. The use of such a requirement, already mandated by several Member States (MSs) through their aeronautical information publications (AIPs), is increasing the coordination between the flight crew and ATC, when anticipating the development of urgency or distress situations. The addition of such requirement to the IR will enhance the safety aspects of the existing in-flight fuel management requirements. The term 'pilot' used by ICAO has been replaced by 'he/she' for the sake of consistency within the Air OPS Regulation.
CAT.OP.MPA.185(c)	The current IR needs to be updated to reflect the recent changes to ICAO Annex 6 and ICAO Doc 4444 — PANS-ATM with regard to situations of fuel emergency. The 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 the ATC and the commanders of other flights operating on the same frequency. Note: the proposed new GM1 CAT.OP.MPA.185(a)(4), (b) & (c) Fuel scheme — In-flight fuel management policy — aeroplanes addresses landing options

	on other-than-adequate aerodromes.

GM	**GM CAT.OP.MPA.185(b)(3) Fuel scheme — in-flight fuel management policy — aeroplanes**
	Notes 1 and 2 located below SARP 4.3.7.2.2 of ICAO Annex 6, Part I, address the scope and implications of the MINIMUM FUEL declaration, therefore providing operators with clear expectations regarding the declaration of MINIMUM FUEL. The GM also includes a reference to ICAO Doc 9976; in this document, several sample scenarios are illustrated to explain when MINIMUM FUEL should be declared and what the reaction from the ATC would be.
GM	**GM1 CAT.OP.MPA.185(a)(4), (b) & (c) Fuel scheme — in-flight fuel management policy — aeroplanes**
	An explanation of 'safe landing' is provided in the context of FRF protection both during normal and emergency operations. The text applies to CAT.OP.MPA.185(b), where the term 'safe landing' is used and the protection of FRF is addressed. In addition, the proposed new GM provides an explanation of the term 'safe landing' in the context of the Air OPS Regulation, in particular with regard to the protection of FRF where the term 'adequate aerodrome' is used instead of the ICAO unqualified 'aerodrome'. The GM clarifies that the protection of FRF during normal operations is applicable to aerodromes which have been assessed as being 'adequate' by the operator (see Annex I (Definitions) to the Air OPS Regulation, CAT.OP.MPA.105 Use of aerodromes and OM-A, 8.1.2 — Criteria and responsibilities for determining the adequacy of aerodromes to be used). The use of other 'last-ditch' landing options (e.g. military aerodromes, closed runways, 'emergency' aerodromes) is subject to the emergency declaration MAYDAY FUEL; in such cases, the commander *may deviate from rules, operational procedures and methods in the interest of safety*, as stated in CAT.GEN.MPA.105(b). The GM also provides reference to ICAO Doc 9976 for the development of the operator's in-flight fuel management policy and procedures, especially with respect to the protection of FRF under normal operations, including replanning or committing to a single landing option.

Requirement	CAT.OP.MPA.197 Refuelling with an engine running — aeroplanes
	Fuelling with an engine running is extremely hazardous and should normally not be conducted. However, some type certificate (TC) holders have developed specific procedures for conducting hot refuelling under unforeseen and exceptional circumstances, i.e. unserviceability of the auxiliary power unit (APU) in combination with the absence of suitable ground support equipment. Despite precautions taken at dispatch through an appropriate revision of the minimum equipment list (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 but high severity. Currently there is no regulations available . However, the Agency published on 23 May 2014 another related Safety Information Bulletin (SIB) No 2014-16 on 'Aeroplane Refuelling with One Engine Running'. The proposed text considered the above and proposed a way forward to regulate refuelling when an engine is running.
Requirement	**CAT.OP.MPA.245 Meteorological conditions — all aircraft**
	In order to ensure consistency throughout the rule and a correct implementation thereof, the wording of 'commence the take-off' has been replaced by 'commence the flight'. With this proposal, the requirement will include taxiing, and for that purpose, further requirements were developed with regard to taxi fuel and unforeseen delays, together with appropriate related GM (see new CAT.OP.MPA.181 and associated GM). In addition, in-flight fuel management has been improved; amongst others, the proposed new requirement contains ICAO Annex 6, Part I, SARP 4.3.6.7.

3. Proposed amendments

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

(a) deleted text is marked with ~~strike through~~;

(b) new or amended text is highlighted in grey;

(c) an ellipsis (…) indicates that the remaining text is unchanged in front of or following the reflected amendment.

3.1. Draft Regulation (draft EASA Opinion) — Definitions

1. 'Definitions' is amended as follows:

Definitions for terms used in Annexes II to VIII

For the purpose of this Regulation, the following definitions shall apply:

(…)

'alternate aerodrome' means an adequate aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes may include the following:

— 'take-off alternate aerodrome': an alternate aerodrome at which an aircraft can land, should this become necessary shortly after take-off, and if it is not possible to use the aerodrome of departure;

— 'destination alternate aerodrome': an alternate aerodrome at which an aircraft would be able to land, should it become either impossible or inadvisable to land at the destination aerodrome of intended landing;

— 'en route alternate (ERA) aerodrome': an adequate alternate aerodrome along the route, where an aircraft could land after experiencing an abnormal or emergency condition while en route; and

— 'fuel ERA aerodrome': an ERA aerodrome required at the planning stage:

- for the purpose of reducing contingency fuel; or
- which is used for the additional fuel, and which should permit the aeroplane to proceed from the most critical point along the route to a fuel en route alternate aerodrome (fuel ERA) in the relevant aircraft configuration, hold there for 15 min at 1 500 ft (450 m) above aerodrome elevation in standard conditions, make an approach and land;

(…)

'safe landing' means a safe landing in the context of the fuel policy/fuel schemes; a landing at an adequate aerodrome or operating site, or for helicopters, at a precautionary landing site, with no less than the final reserve fuel and in compliance with the applicable operational procedures and aerodrome operating minima.

(…)

3.2. Draft AMC/GM (draft EASA Decision) — Definitions

1. New GM13 NCO.OP.125(b) is introduced as follows:

GM13 Annex I Definitions

FUEL SCHEMES

'Flight following' means the recording in real time of departure and arrival messages by operational personnel to ensure that a flight is operating and has arrived at the destination aerodrome.

'Flight monitoring', in addition to the requirements defined for flight following, flight monitoring includes the:

(a) operational monitoring of flights by suitably qualified operational control personnel from the point of departure throughout all phases of the flight;

(b) communication of all available and relevant safety information between the operational control personnel on the ground and the flight crew; and

(c) provision of critical assistance to the flight crew in the event of an in-flight emergency or security issue, or at the request of the flight crew.

'Flight watch': in addition to all of the elements defined for flight following and flight monitoring, flight watch includes the active tracking of a flight by suitably qualified operational control personnel throughout all phases of the flight to ensure that the flight is following its prescribed route, without unplanned deviation, diversion or delay.

Definitions related to fuel schemes are provided in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015).

'Current fuel scheme': means the approved fuel scheme currently used by the operator. In the context of individual fuel schemes, 'current fuel scheme' means the fuel scheme in use just before applying for the approval of the individual fuel scheme. Note: fuel scheme is defined in CAT.OP.MPA.180.

'Flight': in the context of fuel schemes, is when the aircraft first moves under its own power.

3.3. Draft Regulation (draft EASA Opinion) — Part-ARO

1. ARO.OPS.225 is amended as follows:

ARO.OPS.225 Approval ~~of operations to an isolated aerodrome~~of fuel schemes

(a) The competent authority shall approve the fuel scheme proposed by a CAT operator if they demonstrate compliance with CAT.OP.MPA.180, CAT.OP.MPA.181, CAT.OP.MPA.183 and CAT.OP.MPA.185.

(b) The competent authority shall jointly assess and oversee the flight planning and in-flight replanning, selection of aerodrome and in-flight fuel management policies associated with the fuel schemes, together with the processes that support the implementation of these fuel schemes.

(c) In addition to (a) and (b) above, when approving individual fuel schemes, the competent authority shall:

(1) verify that the operator has demonstrated a baseline safety performance of the current scheme;

(2) assess the capability of the operator to support the implementation of the proposed individual fuel scheme; the following elements shall be considered as a minimum:

(i) management system, and

(ii) operational capabilities;

(3) evaluate the operator's safety risk assessment supporting the proposed individual scheme in order to demonstrate how an equivalent level of safety to that of the current approved scheme can be achieved; and

(4) perform a periodic assessment of the approved individual fuel scheme to determine whether such scheme should be confirmed, amended or revoked.

(d) The approval referred to in ~~CAT.OP.MPA.106~~ CAT.OP.MPA.183(c) shall include a list of the aerodromes specified by the operator to which the approval applies.

3.4. Draft AMC/GM (draft EASA Decision) — Part-ARO

1. New AMC1 ARO.OPS.225 is introduced as follows:

AMC1 ARO.OPS.225 Approval of fuel schemes

OVERSIGHT — VERIFICATION OF COMPLIANCE

(a) When approving a basic fuel scheme, the competent authority should be satisfied that the operator fulfils the applicable criteria of AMC1 CAT.OP.MPA.180.

(b) When approving a fuel scheme with variations, the competent authority should be satisfied that the operator fulfils the applicable criteria of AMC2 CAT.OP.MPA.180.

(c) When approving individual fuel schemes which deviate, fully or in part, from the basic fuel schemes, the competent authority should be satisfied that the operator fulfils the criteria of AMC3 CAT.OP.MPA.180.

(d) Before issuing the approval of an individual fuel scheme, the competent authority should verify:

(1) the maturity and capability of the operator's management system, and this system's suitability;

(2) the adequacy of the system for exercising operational control;

(3) the adequacy of the operator's standard operating procedures;

(4) the resolution of significant findings in the areas that will support the application of the individual fuel scheme;

(5) the suitability of the communication and navigation equipment of the aircraft fleet to which the individual fuel scheme will apply;

(6) the areas of operation where the individual fuel scheme will be used;

(7) the operator's ability to provide reliable and accurate aircraft-specific fuel data;

(8) the suitability of the relevant training programmes, including for flight crew and operational control personnel; and

(9) the experience of the relevant personnel, fundamentally of the flight crew, in the use of the procedures and systems that support the fuel scheme.

(e) After issuing the approval of individual fuel schemes, the competent authority should have a process to verify the operator's continued compliance therewith.

2. New AMC1 ARO.OPS.225(c) is introduced as follows:

AMC1 ARO.OPS.225(c) Approval of fuel schemes

CAPABILITIES OF THE COMPETENT AUTHORITY TO APPROVE INDIVIDUAL FUEL SCHEMES

(a) In order to approve individual fuel schemes, the competent authority should have the necessary knowledge and expertise to understand, monitor and validate the criteria of AMC1 ARO.OPS.225(d) above.

(b) For this purpose, the competent authority inspectors reviewing the application should be able to understand the relevance and meaningfulness of the operator's safety performance indicators (SPIs) and targets, as well as of the means by which these targets are achieved.

(c) The competent authority should develop guidance to be used by its inspectors when approving and verifying the individual fuel scheme.

3. New GM1 ARO.OPS.225(c) is introduced as follows:

GM1 ARO.OPS.225(c) Approval of fuel schemes

GUIDANCE FOR THE INSPECTORS OF THE COMPETENT AUTHORITY

The guidance for the inspector may cover the following elements in the areas that will support the application of the individual fuel scheme:

(a) operator's responsibilities:

(1) operational control systems (organisation control over internal processes);

(2) policy and procedures;

(3) qualified personnel:

(i) competence and experience of the flight crew and personnel of the operator, and

(ii) their training;

(4) compliance and suitability of the standard operating procedures (SOPs);

(5) monitoring of effectiveness of individual fuel scheme processes; and

(6) continuous improvement;

(b) operational characteristics:

(1) of the aeroplane: current aircraft-specific data derived from a fuel consumption monitoring system;

(2) of the area of operations:

(i) aerodrome technologies,

(ii) meteorological capabilities,

(iii) air traffic management (ATM) infrastructure, and

(iv) aerodrome capabilities and air traffic services (ATS) characteristics;

(3) a suitable computerised flight plan;

(4) flight monitoring or flight watch capabilities, as applicable;

(5) communication systems: ground-based and airborne systems;

(6) navigations systems: ground-based and airborne systems; and

(7) reliable meteorological and aerodrome information; and

(c) safety risk management:

(1) agreed safety performance indicators (SPIs),

(2) risk register,

(3) identification of hazards,

(4) risk monitoring, and

(5) compliance monitoring.

Note: further guidance is provided in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual, Appendix 7 to Chapter 5 — A performance-based approach job-aid for an approving Authority (1st Edition, 2015).

4. New GM2 ARO.OPS.225(c) is introduced as follows:

GM2 ARO.OPS.225(c) Approval of fuel schemes

INDIVIDUAL FUEL SCHEMES — RESOLUTION OF SIGNIFICANT FINDINGS

The resolution of significant findings in the relevant areas means that the approval may be rejected when the operator has not adequately addressed the relevant findings, or when unacceptable open findings exist that affect the areas supporting the individual fuel scheme (such as operational control, safety management system, operator’s safety risk assessment processes, availability of data, safety performance indicators (SPIs), pilot training, etc.).

5. New GM2 ARO.OPS.225(c)(2)(i) is introduced as follows:

GM2 ARO.OPS.225(c)(2)(i) Approval of fuel schemes

CAPABILITIES OF THE COMPETENT AUTHORITY TO APPROVE INDIVIDUAL FUEL SCHEMES

The competent authority should be satisfied of the robustness of the operator's management system, in particular with regard to the safety risk management, performance monitoring and measurement processes.

3.5. Draft AMC/GM (draft EASA Decision) — Part-ORO

1. AMC3 ORO.MLR.100 is amended as follows:

AMC3 ORO.MLR.100 Operations manual — general

CONTENTS — CAT OPERATIONS

(a) The OM should contain at least the following information, where applicable, as relevant for the area and type of operation:

A GENERAL/BASIC

0 ADMINISTRATION AND CONTROL OF OPERATIONS MANUAL

0.1 Introduction:

(…)

8.2 Ground handling instructions. As applicable to the operation:

8.2.1 Fuelling procedures. A description of fuelling procedures, including:

(a) safety precautions during refuelling and defueling including when an auxiliary power unit is in operation or when rotors are running or when an engine is or engines are running ~~and the prop-brakes are on~~;

(…)

2. GM3 ORO.GEN.130(b) is amended as follows:

GM3 ORO.GEN.130(b) Changes related to an AOC holder

CHANGES REQUIRING PRIOR APPROVAL

The following GM is a non-exhaustive checklist of items that require prior approval from the competent authority as specified in the applicable Implementing Rules:

(a) alternative means of compliance;

(…)

(i) ~~fuel policy~~fuel schemes;

(…)

3.6. Draft Regulation (draft EASA Opinion) — Part-CAT

1. CAT.OP.MPA.106 is deleted as follows:

~~**CAT.OP.MPA.106 Use of isolated aerodromes — aeroplanes**~~

~~(a) Using an isolated aerodrome as destination aerodrome with aeroplanes requires the prior approval by the competent authority.~~

~~(b) An operator may consider a destination aerodrome as an isolated aerodrome if the alternate and final fuel reserve required to the nearest adequate destination alternate aerodrome is more than:~~

~~(1) for aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15 % of the flying time planned to be spent at cruising level or 2 hours, whichever is less; or~~

~~(2) for aeroplanes with turbine engines, fuel to fly for 2 hours at normal cruise consumption above the destination aerodrome, including final reserve fuel.~~

~~(c) A flight to be conducted to an isolated aerodrome shall not be continued past the point of no return to any available en route alternate (ERA) aerodrome unless a current assessment of meteorological conditions, traffic and other operational conditions indicates that a safe landing can be made at the estimated time of use.~~

2. CAT.OP.MPA.150 is amended as follows:

Please refer to sub-NPA (B) 'Helicopters — Annex I (Definitions), Part-CAT, Part-SPA, Part-NCC, Part-NCO & Part-SPO.

3. CAT.OP.MPA.151 is amended as follows:

Please refer to sub-NPA (B) 'Helicopters — Annex I (Definitions), Part-CAT, Part-SPA, Part-NCC, Part-NCO & Part-SPO.

4. New CAT.OP.MPA.180 is introduced as follows:

CAT.OP.MPA.180 Fuel scheme

(a) The operator shall establish, implement and maintain a fuel scheme composed of:

(1) a fuel planning and an in-flight replanning policy;

(2) a selection of aerodromes policy; and

(3) an in-flight fuel management policy.

(b) The fuel scheme shall:

(1) be appropriate for the type(s) of operation performed; and

(2) correspond to the capability of the operator to support its implementation.

(c) The fuel scheme and any change to it shall require prior approval by the competent authority.

(d) The operator may apply for an individual fuel scheme, prior to the implementation of which the operator shall:

(1) establish a baseline safety performance of its current fuel scheme;

(2) demonstrate its capability to support the implementation of the proposed individual fuel scheme; and

(3) perform a safety risk assessment demonstrating how an equivalent level of safety is achieved compared to that of the current fuel scheme.

5. New CAT.OP.MPA.181 is introduced as follows:

CAT.OP.MPA.181 Fuel scheme — fuel planning and in-flight replanning policy

(a) The operator shall establish as part of the fuel scheme a fuel planning and in-flight replanning policy to ensure that every aeroplane carries a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation.

(b) The operator shall ensure that the fuel planning of flights is based upon at least:

(1) procedures contained in the operations manual and:

(i) current aircraft-specific data derived from a fuel consumption monitoring system; or, if not available;

(ii) data provided by the aircraft manufacturer; and

(2) the operating conditions under which the flight is to be conducted including:

(i) aircraft fuel consumption data;

(ii) anticipated masses;

(iii) expected meteorological conditions;

(iv) anticipated delays; and

(v) the effects of deferred maintenance items and/or configuration deviations.

(c) The operator shall ensure that the preflight calculation of usable fuel required for a flight includes:

(1) taxi fuel, which shall not be less than the amount expected to be used prior to take-off;

(2) trip fuel, which shall be the amount of fuel required to enable the aeroplane to fly from take-off, or from the point of in-flight replanning, until landing at the destination aerodrome, taking into account the operating conditions of (b) above;

(3) contingency fuel, which shall be the amount of fuel required to compensate for unforeseen factors;

(4) destination alternate fuel:

(i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel required to fly to the destination alternate aerodrome; or

(ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel required to hold at destination, whilst enabling the aircraft to perform a safe landing, and allow for deviations from the planned operation; as a minimum, this amount shall be 15-min fuel at holding speed at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the estimated mass on arrival at the destination aerodrome;

(5) final reserve fuel, which shall not be less than:

(i) for aeroplanes with reciprocating engines, the fuel to fly for 45 min; or

(ii) for turbine-engined aeroplanes, the fuel to fly for 30 min at holding speed at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome when no destination alternate aerodrome is required;

(6) additional fuel, if required by the type of operation, which shall be the amount of fuel to allow the aeroplane to perform a safe landing to an en-route alternate aerodrome (fuel ERA) in the event of an engine failure or loss of pressurisation, whichever requires a greater amount of fuel, based on the assumption that such a failure occurs at the most critical point along the route; this additional fuel is only required if the minimum amount of fuel calculated in accordance with (c)(2) to (c)(5) above is not sufficient for such an event;

(7) extra fuel, to take into account anticipated delays or specific operational constraints; and

(8) discretionary fuel, if required by the commander.

(d) The operator shall ensure that in-flight replanning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination aerodrome other than originally planned includes: (c)(2) to (c)(8) above.

6. CAT.OP.MPA.182 is introduced as follows:

CAT.OP.MPA.182 Fuel schemes — fuel planning and in-flight replanning policy

FUEL SCHEME WITH VARIATIONS — PERFORMANCE CLASS B AEROPLANES

(a) Notwithstanding CAT.OP.MPA.181(b) to (d), for operations of Performance Class B aeroplanes, the operator shall ensure that the preflight calculation of usable fuel required for a flight includes:

(i) taxi fuel, if significant;

(ii) trip fuel;

(iii) reserve fuel, consisting of:

(A) contingency fuel that is not less than 5 % of the planned trip fuel or, in the event of in-flight replanning, 5 % of the trip fuel for the remainder of the flight; and

(B) final reserve fuel to fly for an additional period of 45 min for reciprocating engines or 30 min for turbine engines;

(iv) alternate fuel to reach the destination alternate aerodrome via the destination, if a destination alternate aerodrome is required; and

(v) extra fuel, if specified by the commander.

(b) Notwithstanding CAT.OP.MPA.181(b) to (d), for operations taking off and landing at the same aerodrome or operating site with ELA2 aeroplanes under visual flight rules (VFR) by day, the operator shall specify the minimum final reserve fuel in the operations manual (OM). This minimum final reserve fuel shall not be less than the amount needed to fly for a period of 45 min.

7. New CAT.OP.MPA.183 is introduced as follows[16]:

CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes

(a) At planning stage, the operator shall ensure that once the flight has commenced, there is reasonable certainty that an aerodrome where a safe landing can be made will be available at the estimated time of use of this aerodrome.

(b) At planning stage, for each instrument flight rules (IFR) flight, the operator shall select, on the air traffic services (ATS) flight plan, one or more aerodromes so that two options for a safe landing will be available when reaching the destination in normal operation.

(c) Using an isolated aerodrome as destination aerodrome requires the prior approval by the competent authority. A flight to be conducted to an isolated aerodrome shall not be continued past the point of no return to any available en route alternate (ERA) aerodrome unless a current assessment of meteorological conditions, traffic and other operational conditions indicates that a safe landing can be made at the estimated time of use of the destination aerodrome.

(d) The operator shall apply appropriate safety margins to flight planning in order to take into account possible deterioration of the meteorological conditions at the estimate time of landing compared to the available forecast.

(e) The operator shall ensure, for each instrument flight rules (IFR) flight, that sufficient means are available to navigate and land at the destination aerodrome or at any destination alternate aerodrome in the case of loss of capability for the intended approach and landing operation.

(f) In order to allow a safe landing when experiencing abnormal or emergency conditions after take-off, the operator shall select and specify in the operational flight plan a take-off alternate aerodrome if:

(1) either the meteorological conditions at the aerodrome of departure are below the operator's established aerodrome landing minima for that operation; or

(2) it would not be possible to return to the aerodrome of departure for other reasons.

(g) The take-off alternate aerodrome shall be located within a distance from the departure aerodrome that minimises the risk of exposure to potential abnormal or emergency operations. In selecting the take-off alternate aerodrome, the operators shall consider at least:

[16] CAT.OP.MPA.183(e) has already been proposed under a different number by EASA Opinion No 03/2015 of 31.3.2015.

(1) the actual and forecast weather conditions;

(2) the availability and quality of the aerodrome infrastructure;

(3) the aircraft navigation and landing capabilities in abnormal or emergency conditions, taking into account the redundancy of the critical systems; and

(4) the approvals held (e.g. extended-range twin operations (ETOPS), low visibility operations (LVO) etc.).

8. CAT.OP.MPA.185 is replaced with the following:

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

(a) The operator shall establish procedures for in-flight fuel management which ensure:

(1) continuous validation of the assumptions made during the planning stage (preflight and/or in-flight replanning);

(2) reanalysis and adjustment if necessary;

(3) delay information is obtained from air traffic control (ATC) when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any:

(i) fuel required to proceed to an alternate aerodrome; or

(ii) the fuel required to operate to an isolated aerodrome; and

(4) 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.

(b) The commander shall advise the ATC of a 'minimum fuel' state by declaring MINIMUM FUEL when he/she:

(1) has committed to land at a specific aerodrome; and

(2) calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

(c) The commander shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL when the 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.

9. CAT.OP.MPA.196 is introduced as follows:

CAT.OP.MPA.196 Refuelling with an engine running — aeroplanes

(a) Refuelling with an engine running shall only be conducted:

1) in unforeseen and exceptional circumstances;

2) in accordance with the specific procedures established by the type certificate (TC) holder of the aeroplane;

3) by aeroplanes using JET A or JET A-1 fuel types;

4) with no passengers embarking, on board or disembarking;

5) under permission by the aerodrome operator; and

6) in the presence of the aerodrome rescue and firefighting services (RFFS).

(b) The operator shall assess the risks associated with refuelling with an engine running and shall establish appropriate procedures to be followed by all involved personnel such as flight crew, cabin crew and ground handling personnel. The procedures shall be specified in the operations manual (OM).

10. CAT.OP.MPA.245 is amended as follows:

CAT.OP.MPA.245 Meteorological conditions — all aircraft

(a) On IFR flights the commander shall only:

(1) commence ~~take-off~~ the flight; or

(2) continue beyond the point from which a revised ATS flight plan applies in the event of in-flight replanning,

(…)

11. CAT.OP.MPA.245 is amended as follows:

CAT.OP.MPA.246 Meteorological conditions — aeroplanes

In addition to CAT.OP.MPA.245, on IFR flights with aeroplanes, the commander shall only continue beyond:

(a) the decision point when using the reduced contingency fuel (RCF) procedure; or

(b) the ~~pre-determined point when using the pre-determined point (PDP) procedure~~ point of no return when using the isolated-aerodrome procedure,

when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the applicable aerodrome operating minima.

12. CAT.OP.MPA.280 is deleted:

~~**CAT.OP.MPA.280 In-flight fuel management — aeroplanes**~~

~~The operator shall establish a procedure to ensure that in-flight fuel checks and fuel management are carried out according to the following criteria.~~

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

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

~~(i) compare actual consumption with planned consumption;~~

~~(ii check that the usable remaining fuel is sufficient to complete the flight, in accordance with (b); and~~

~~(iii) determine the expected usable fuel remaining on arrival at the destination aerodrome.~~

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

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

~~(1) The flight shall be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:~~

~~(i) the required alternate fuel plus final reserve fuel; or~~

~~(ii) the final reserve fuel if no alternate aerodrome is required.~~

~~(2) If an in-flight fuel check shows that the expected usable fuel remaining on arrival at the destination aerodrome is less than:~~

~~(i) the required alternate fuel plus final reserve fuel, the commander shall take into account the traffic and the operational conditions prevailing at the destination aerodrome, at the destination alternate aerodrome and at any other adequate aerodrome in deciding whether to proceed to the destination aerodrome or to divert so as to perform a safe landing with not less than final reserve fuel; or~~

~~(ii) the final reserve fuel if no alternate aerodrome is required, the commander shall take appropriate action and proceed to an adequate aerodrome so as to perform a safe landing with not less than final reserve fuel.~~

~~(3) The commander shall declare an emergency when the calculated usable fuel on landing, at the nearest adequate aerodrome where a safe landing can be performed, is less than final reserve fuel.~~

~~(4) Additional conditions for specific procedures~~

~~(i) On a flight using the RCF procedure, to proceed to the destination 1 aerodrome, the commander shall ensure that the usable fuel remaining at the decision point is at least the total of:~~

~~(A) trip fuel from the decision point to the destination 1 aerodrome;~~

~~(B) contingency fuel equal to 5 % of trip fuel from the decision point to the destination 1 aerodrome;~~

~~(C) destination 1 aerodrome alternate fuel, if a destination 1 alternate aerodrome is required; and~~

~~(D) final reserve fuel.~~

~~(ii) On a flight using the PDP procedure to proceed to the destination aerodrome, the commander shall ensure that the usable fuel remaining at the PDP is at least the total of:~~

~~(A) trip fuel from the PDP to the destination aerodrome;~~

~~(B) contingency fuel from the PDP to the destination aerodrome; and~~

~~(C) additional fuel.~~

3.7. Draft AMC/GM (draft EASA Decision) — Part-CAT

1. New GM1 CAT.OP.MPA.107 is introduced as follows:

GM1 CAT.OP.MPA.107 Adequate aerodrome

An adequate aerodrome is an aerodrome where weather conditions are not considered.

2. AMC1 CAT.OP.MPA.175(a) is amended as follows:

AMC1 CAT.OP.MPA.175(a) Flight preparation

OPERATIONAL FLIGHT PLAN — COMPLEX MOTOR-POWERED AIRCRAFT

(a) The operational flight plan used and the entries made during flight should contain the following items:

(1) aircraft registration;

(2) aircraft type and variant;

(3) date of flight;

(4) flight identification;

(5) names of flight crew members;

(6) duty assignment of flight crew members;

(7) place of departure;

(8) time of departure (actual off-block time, take-off time);

(9) place of arrival (planned and actual);

(10) time of arrival (actual landing and on-block time);

(11) type of operation (ETOPS, VFR, ferry flight, etc.);

(12) route and route segments with checkpoints/waypoints, distances, time and tracks;

(13) planned cruising speed and flying times between check-points/waypoints (estimated, revised and actual times overhead);

(14) safe altitudes and minimum levels;

(15) planned altitudes and flight levels;

(16) fuel calculations (records of in-flight fuel checks);

(17) fuel on board when starting engines;

(18) alternate(s) for destination, ~~and, where applicable, take-off and en-route~~ including the information required in (a)(12) to (15), ~~where applicable destination 1 & 2~~ as well destination 2 and destination 2 alternates in case of a reduced contingency fuel (RCF) procedure;

(19) where applicable, an alternate take-off and fuel ERA aerodrome(s);

~~(19)~~(20) initial ATS flight plan clearance and subsequent reclearance;

~~(20)~~(21) in-flight replanning calculations; and

~~(21)~~(22) relevant meteorological information.

(b) Items that are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

(…)

3. New AMC1 CAT.OP.MPA.180 is introduced as follows:

AMC1 CAT.OP.MPA.180 Fuel scheme

BASIC FUEL SCHEME

(a) A basic fuel scheme should comply in full with AMC1 CAT.OP.MPA.181, AMC1 CAT.OP.MPA.183 and AMC1 CAT.OP.MPA.185.

(b) When the operator wishes to use alternative means to the basic fuel scheme, then they should comply with AMC3 CAT.OP.MPA.180 in order to ensure that an equivalent level of safety is achieved.

4. New AMC2 CAT.OP.MPA.180 is introduced as follows:

AMC2 CAT.OP.MPA.180 Fuel scheme

FUEL SCHEME WITH VARIATIONS

(a) A fuel scheme with variations is a basic fuel scheme that incorporates one or more of the variations detailed in AMC2 CAT.OP.MPA.181 and AMC 2CAT.OP.MPA.183.

(b) A fuel scheme with variations is not an individual fuel scheme.

5. New AMC3 CAT.OP.MPA.180 is introduced as follows:

AMC3 CAT.OP.MPA.180 Fuel scheme

INDIVIDUAL FUEL SCHEME

(a) An individual fuel scheme is a fuel scheme which deviates, fully or in part, from those adopted by the Agency referred to in AMC1 CAT.OP.MPA.181, AMC2 CAT.OP.MPA.181, AMC1 CAT.OP.MPA.183, AMC1 CAT.OP.MPA.183(d) AMC2 CAT.OP.MPA.183 and AMC1 CAT.OP.MPA.185.

(b) Prior to submitting an individual fuel scheme for approval, the operator should:

(1) measure the baseline safety performance related to its operation with the current fuel scheme; to this purpose the operator should:

(i) select safety performance indicators (SPIs) and targets, agreed with the competent authority; and

(ii) collect data for a period of at least 2 years of continuous operation (note: the number of flights should be sufficient data to support the intended deviation);

(2) identify the hazards associated with the individual fuel scheme and perform a safety risk assessment of these hazards;

(3) establish and monitor risk controls based on the above assessment in order to ensure an equivalent level of safety compared to that of the current fuel scheme; and

(4) establish an effective continuous reporting system to the competent authority on the safety performance and regulatory compliance of the individual fuel scheme.

(c) When determining the extent of the deviation from the current fuel scheme, the operator should take into account for the relevant area of operation:

(1) the available aerodrome technologies, capabilities and infrastructure;

(2) the reliability of meteorological and aerodrome information;

(3) the reliability of the aeroplane systems, especially the time-limited ones; and

(4) the type of air traffic services (ATS) provided and, where applicable, air traffic flow management and airspace management characteristics and procedures.

(d) An operator wishing to apply for the approval of an individual fuel scheme should be able to demonstrate that it exerts sufficient organisational control over internal processes and the use of resources. The operator should adapt its management system to ensure that:

(1) processes and procedures supporting the individual fuel scheme are established;

(2) involved flight crew and personnel are trained and competent to perform their tasks; and

(3) the implementation and effectiveness of such processes, procedures and training are monitored.

(e) The operator should possess operational capabilities which can support the implementation of an individual fuel scheme. As a minimum, the operator should:

(1) have a suitable computerised flight planning system;

(2) ensure that planning of flights is based upon current aircraft-specific data derived from a fuel consumption monitoring system and accurate metrological data;

(3) have airborne fuel prediction systems;

(4) be able to operate in required navigation performance (RNP) 4 oceanic and remote continental airspace and in area navigation (RNAV) 1 continental en route airspace, as applicable;

(5) be able to perform RNP approach (APCH) down to vertical navigation (VNAV) minima; and

(6) establish an operational control system, for updating the available landing options, capable of:

(i) exercising at least flight monitoring;

(ii) collecting and continuously monitoring reliable meteorological, aerodrome and traffic information;

(iii) having a communication system allowing ground personnel and flight crew to rapidly and reliably exchange essential operational information; and

(iv) monitoring the status of ground and aircraft systems in relation to landing capabilities.

(f) After receiving the approval, the operator should:

(1) continuously measure and monitor the outcome of each SPI; and

(2) in case of degradation of any SPI:

(i) assess the root cause of the degradation;

(ii) identify remedial actions to restore the baseline safety performance.; and

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

6. New GM3 CAT.OP.MPA.180 is introduced as follows:

GM3 CAT.OP.MPA.180 Fuel scheme

APPLICABILITY — BASELINE SAFETY PERFORMANCE — SAFETY PERFORMANCE INDICATORS (SPIS) AND EQUIVALENT LEVEL OF SAFETY

(a) Establishing a baseline safety performance involves collecting historical data for the selected SPIs over the defined period of time. The safety performance outcome of an operator’s process would then be measured against this baseline safety performance, before and after implementation of the specific individual fuel scheme.

(b) Agreed SPIs should be commensurate with the complexity of an individual operator’s specific operational contexts, the extent of the deviations from the current fuel scheme, and the availability of resources to address those SPIs.

(c) The following is a non-exhaustive list of SPIs which may be used to measure the baseline safety performance:

(1) flights with 100 % consumption of contingency fuel;

(2) difference between planned and actual trip fuel;

(3) landings with less than final reserve fuel remaining;

(4) MINIMUM FUEL state declarations;

(5) MAYDAY FUEL declarations;

(6) in-flight replanning to the planned destination due to fuel shortage, including ‘committing’ to destination by cancelling the planned destination alternate;

(7) diversion to an en route alternate (ERA) aerodrome to protect the final reserve fuel; and

(8) diversion to the destination alternate.

Note: for certain non-data-based monitoring SPIs, alert and target levels may be qualitative in nature.

(d) Equivalent level of safety: SPIs and associated targets achieved after the introduction of an individual fuel scheme should 'be equivalent to' or 'exceed' the SPIs and associated targets using the previously approved fuel scheme. To determine if such equivalence has been achieved, the safety performance of operational activities before and after the application of the individual fuel scheme should be carefully compared with one another. For example, the average number of landings with less than the final reserve fuel should not increase after the introduction of the individual fuel scheme.

(e) The applicability of the operator's fuel scheme may be limited to a specific aircraft fleet or type/variant or area of operations. Different policies may be established as long as the procedures clearly specify the boundaries of each policy so that the flight crew is aware of the policy being applied. This is also applicable to individual fuel schemes where, for example, an operator may wish to deviate from the basic 5 % contingency policy only in certain areas of operations or only for a specific aircraft fleet or type/variant. The safety performance associated with the fuel scheme may be measured according to the relevant area of operation and aircraft fleet or type/variant so that any degradation of this safety performance can be isolated and mitigated separately. In this case, the approval for a deviation may be suspended for the affected area and/or aircraft type/variant until the required safety performance is achieved.

Note: further guidance is provided in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015).

7. AMC1 CAT.OP.MPA.150(b) is replaced with AMC1 CAT.OP.MPA.181 as follows:

AMC1 CAT.OP.MPA.181 Fuel scheme — fuel planning and in-flight replanning policy

BASIC FUEL PLANNING AND IN-FLIGHT REPLANNING POLICY — AEROPLANES

(a) The operator should establish a basic fuel planning policy which complies with the fuel calculation criteria detailed in (c) below.

(b) To take advantage of:

(1) variations in the calculations of contingency fuel, the operator should fulfil specific criteria detailed in AMC2 CAT.OP.MPA.181; and

(2) individual fuel schemes that propose alternative means to the calculation of usable fuel required for a flight, the operator should fulfil the criteria detailed in AMC3 CAT.OP.MPA.180.

(c) For the basic fuel planning policy, the amount of usable fuel required for a flight should be not less than the sum of the following:

(1) taxi fuel which should not be less than the amount expected to be used prior to take-off; the local conditions at the departure aerodrome and auxiliary power unit (APU) consumption should be taken into account;

(2) trip fuel, which should include:

(i) fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;

(ii) fuel from top of climb to top of descent, including any step climb/descent;

(iii) fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(iv) fuel for approach and landing at the destination aerodrome;

(3) contingency fuel, which should be higher than:

(i) 5 % of the planned trip fuel or, in the event of in-flight replanning, 5 % of the trip fuel for the remainder of the flight; or

(ii) an amount to fly for 5 min at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions;

(4) destination alternate fuel, which should be:

(i) when the aircraft is operated with one destination alternate aerodrome:

(A) fuel for a missed approach from the applicable decision altitude/height (DA/H) or minimum descent altitude/height (MDA/H) at the destination aerodrome to missed-approach altitude, taking into account the complete missed-approach procedure;

(B) fuel for climb from missed-approach altitude to cruising level/altitude, taking into account the expected departure routing;

(C) fuel for cruising from top of climb to top of descent, taking into account the expected routing;

(D) fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(E) fuel for executing an approach and landing at the destination alternate aerodrome;

(ii) when the aircraft is operated with two destination alternate aerodromes, the amount of fuel calculated in accordance with (c)(4)(i) above, based on the destination alternate aerodrome that requires the greater amount of fuel; and

(iii) when the aircraft is operated with no destination alternate aerodrome, the amount of fuel to hold for 15 min at 1 500 ft (450 m) in standard conditions above the destination aerodrome elevation;

(5) final reserve fuel;

(6) additional fuel, which should permit the aeroplane to proceed from the most critical point along the route to a fuel en route alternate aerodrome (fuel ERA) in the relevant aircraft configuration, hold there for 15 min at 1 500 ft (450 m) above aerodrome elevation in standard conditions, make an approach and land;

(7) extra fuel, to take into account anticipated delays or specific operational constraints; and

(8) discretionary fuel, if required by the commander.

8. New AMC2 CAT.OP.MPA.181 is introduced as follows:

AMC2 CAT.OP.MPA.181 Fuel scheme — fuel planning and in-flight replanning policy

FUEL SCHEME WITH VARIATIONS — TAXI FUEL— AEROPLANES

Taxi fuel: the operator may use statistical taxi fuel.

FUEL SCHEME WITH VARIATIONS — CONTINGENCY FUEL— AEROPLANES

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

(b) Provided that the operator has established and maintained a fuel consumption monitoring programme for individual aeroplanes, and uses valid data for fuel calculation determined by means of such a programme, the operator may use for the calculation of contingency fuel any of the following requirements contained in (c) or (d) bellow.

(c) Contingency fuel, which should be the fuel described in (1) or (2) below, whichever is higher:

(1) either:

(i) not less than 3 % of the planned trip fuel or, in the event of in-flight replanning, 3 % of the trip fuel for the remainder of the flight provided that a fuel en route alternate (fuel ERA) aerodrome is available; or

(ii) an amount of fuel sufficient for 20 min flying time based upon the planned trip fuel consumption; or

(iii) an amount of fuel based on a statistical method that ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel; prior to implementing a statistical fuel method, a continuous 2-year operation is required during which statistical contingency fuel (SCF) data is recorded — note: in order to implement a SCF on a particular city pair/aeroplane combination, sufficient data is required to be statistically significant; this method is used to monitor the fuel consumption on each city pair/aeroplane combination, and the operator uses this data for a statistical analysis to calculate the required contingency fuel for that city pair/aeroplane combination; or

(2) an amount to fly for 5 min at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions.

(d) Reduced contingency fuel (RCF) procedure: if the operator's fuel policy includes preflight planning to a destination 1 aerodrome (commercial destination) with an RCF procedure using a decision point along the route and a destination 2 aerodrome (optional refuel destination), the amount of usable fuel on board for departure should be the greater of (1) or (2) below:

(1) the sum of:

(i) taxi fuel;

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

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

(iv) alternate fuel or no alternate fuel if the decision point is less than 6 hour away from the destination 1 aerodrome and the requirements of AMC1 CAT.OP.MPA.183(b)(2) are fulfilled;

(v) final reserve fuel;

(vi) additional fuel;

(vii) extra fuel if required by the commander; and

(viii) discretionary fuel; or

(2) the sum of:

(i) taxi fuel;

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

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

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

(v) final reserve fuel;

(vi) additional fuel;

(vii) extra fuel if required by the commander; and

(viii) discretionary fuel.

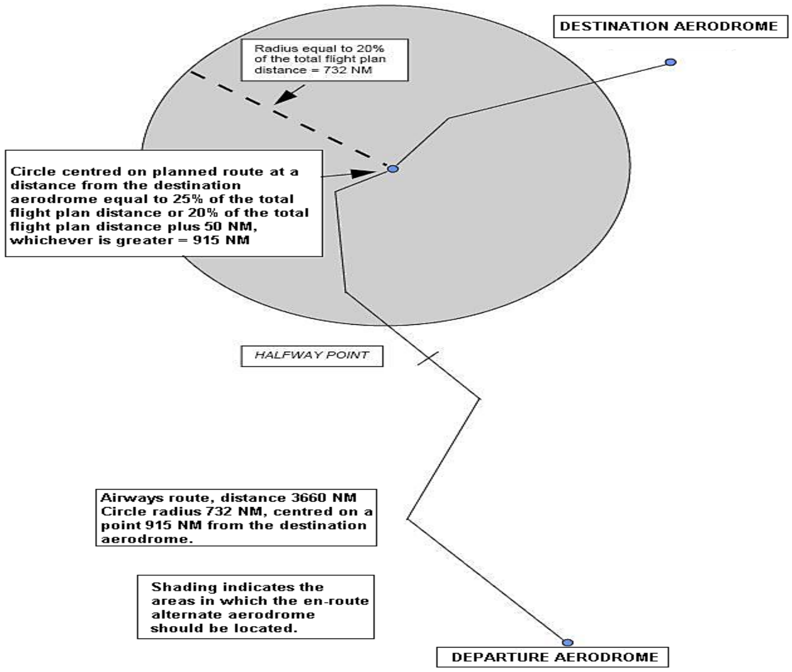
9. New AMC2 CAT.OP.MPA.181(c)(3) is introduced as follows:

AMC1 CAT.OP.MPA.181(c)(3) Fuel scheme — fuel planning and in-flight replanning policy

LOCATION OF THE FUEL EN ROUTE ALTERNATE (FUEL ERA) AERODROME FOR THE PURPOSE OF 3 % CONTINGENCY — BASIC FUEL SCHEME

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

(b) Figure 1 — Location of the fuel ERA aerodrome for the purpose of reducing contingency fuel to 3 %



10. New GM3 CAT.OP.MPA.181 is introduced as follows:

GM1 CAT.OP.MPA.181 Fuel scheme — fuel planning and in-flight replanning policy

INDIVIDUAL FUEL SCHEMES — COMMUNICATION SYSTEM, COMPUTERISED FLIGHT PLANNING SYSTEM AND NAVIGATION CAPABILITIES

Individual fuel schemes are subject to contracted activities in accordance with ORO.GEN.205.

COMMUNICATION SYSTEM

(a) In addition to the minimum communication equipment required by other regulations not linked with fuel schemes, at least one means of communication with the operational control system (e.g. operational control centre (OCC)) should be available during the entire flight (e.g. when flying over the ocean without very high frequency (VHF) coverage, the operator needs either high frequency (HF) or satellite communications (SATCOM)).

(b) Systems should be independently available (e.g. if VHF2 is used for the aircraft communications addressing and reporting system (ACARS) and to radio communicate with the OCC, a failure of this system will prevent communication with the OCC, which is considered unacceptable. Only when HF is additionally available to communicate with the OCC, this situation is considered acceptable).

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

COMPUTERISED FLIGHT PLANNING SYSTEM

Description, functionality and authenticity of the computerised flight planning system software should be considered.

11. New GM1 CAT.OP.MPA.181(b)(1) is introduced as follows:

GM1 CAT.OP.MPA.181(b)(1) Fuel scheme — fuel planning and in-flight replanning policy

PLANNING OF FLIGHTS — AEROPLANES

A flight should be planned using the most accurate information available. If aircraft-specific data derived from a fuel consumption monitoring system is available, this must be used in preference to data provided by the aircraft manufacturer. Only in specific cases should data provided by the aircraft manufacturer be used, for example, when introducing a new aircraft type into service, where no actual flight data has been obtained by the operator.

12. New GM1 CAT.OP.MPA.181(b)(2)(ii) is introduced as follows:

GM1 CAT.OP.MPA.181(b)(2)(ii) Fuel scheme — fuel planning and in-flight replanning policy

ANTICIPATED MASSES — LAST-MINUTE CHANGES

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

13. New GM1 CAT.OP.MPA.181(b)(2)(iii) is introduced as follows:

GM1 CAT.OP.MPA.181(b)(2)(iii) Fuel scheme — fuel planning and in-flight replanning policy

INDIVIDUAL FUEL SCHEMES — METEOROLOGICAL CONDITIONS

When the operator develops the extend of the individual fuel schemes for the area of operation, the reliability of the meteorological forecast reports should be considered; therefore, the extend of a deviation should be restricted or the deviation itself not allowed when reliable meteorological information is not available. To this end, tools to predict and improve the reliability of the metrological report may be explored allowing the intended deviation.

14. New GM1 CAT.OP.MPA.181(c) is introduced as follows:

GM1 CAT.OP.MPA.181(c) Fuel scheme — fuel planning and in-flight replanning policy

FUEL CONSUMPTION MONITORING PROGRAMME

Additional information is provided in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual, Appendix 5 — EXAMPLE OF A FUEL CONSUMPTION MONITORING (FCM) PROGRAMME (1st Edition, 2015).

INDIVIDUAL FUEL SCHEME — FUEL CONSUMPTION MONITORING PROGRAMME

A data-driven method that includes a fuel consumption monitoring programme; should include:

(a) a fuel performance monitoring system;

(b) a database that contains data of 2 years;

(c) statistics and data normalisation; and

(d) data transparency and verification.

15. New GM1 CAT.OP.MPA.181(c)(1) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(1) Fuel scheme — fuel planning and in-flight replanning policy

BASIC FUEL SCHEME — TAXI FUEL — LOCAL CONDITIONS

Local conditions include notice to airmen (NOTAM), meteorological conditions, air traffic services (ATS) procedures (e.g. low visibility procedures (LVP), collaborative decision-making (CDM)), and any anticipated delay(s).

16. New GM1 CAT.OP.MPA.181(c)(2) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(2) Fuel scheme — fuel planning and in-flight replanning policy

POINT MERGE AND TROMBONE PATTERN

(a) When planning for a Point Merge standard terminal arrival route (STAR), fuel for the direct STAR to the Point Merge should be included in the trip fuel. The fuel required to account for the probability that part of or the entire Point Merge procedure needs to be flown may be accounted for in the contingency fuel unless there is an anticipated delay, in which case the fuel required for the procedure should be accounted for in the extra fuel.

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

17. New GM1 CAT.OP.MPA.181(c)(3) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(3) Fuel scheme — fuel planning and in-flight replanning policy

CONTINGENCY FUEL AND UNFORESEEN FACTORS

Contingency fuel is the amount of fuel required to compensate for unforeseen factors.

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

18. GM1 CAT.OP.MPA.150(c)(3)(i) is deleted:

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

~~CONTINGENCY FUEL~~

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

19. GM1 CAT.OP.MPA.150(b) is deleted:

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

~~**CONTINGENCY FUEL STATISTICAL METHOD — AEROPLANES**~~

~~(a) As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel provide appropriate statistical coverage.~~

~~(1) 99 % coverage plus 3 % of the trip fuel, if the calculated flight time is less than 2 h, or more than 2 h and no weather-permissible ERA aerodrome is available.~~

~~(2) 99 % coverage if the calculated flight time is more than 2 h and a weather-permissible ERA aerodrome is available.~~

~~(3) 90 % coverage if:~~

~~(i) the calculated flight time is more than 2 h;~~

~~(ii) a weather-permissible ERA aerodrome is available; and~~

~~(iii) at the destination aerodrome two separate runways are available and usable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with CAT.OP.MPA.180(b)(2), or the ILS/MLS is operational to CAT II/III operating minima and the weather conditions are at or above 500 ft.~~

~~(b) The fuel consumption database used in conjunction with these values should be based on fuel consumption monitoring for each route/aeroplane combination over a rolling 2-year period.~~

20. New GM1 CAT.OP.181(c)(3) is introduced as follows:

GM2 CAT.OP.MPA.181(c)(3) Fuel scheme — fuel planning and in-flight replanning policy

FUEL SCHEME WITH VARIATIONS — CONTINGENCY FUEL STATISTICAL METHOD — AEROPLANES

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

(a) 99 % coverage plus 3 % of the trip fuel, if the calculated flight time is less than 2 h, or more than 2 hours and no weather-permissible ERA aerodrome is available.

(b) 99 % coverage if the calculated flight time is more than 2 hours and a weather-permissible ERA aerodrome is available.

(c) 90 % coverage if:

(1) the calculated flight time is more than 2 h;

(2) a weather-permissible ERA aerodrome is available; and

(3) at the destination aerodrome two separate runways are available and usable, one of which is equipped with an instrument landing system (ILS)/ microwave landing system (MLS), and the weather conditions are in compliance with CAT.OP.MPA.180(b)(2), or the ILS/MLS is operational to CAT II/III operating minima and the weather conditions are at or above 500 ft.

21. GM1 CAT.OP.MPA.150(c)(3)(ii) is deleted:

~~**GM1 CAT.OP.MPA.150(c)(3)(ii) Fuel policy**~~

~~DESTINATION ALTERNATE AERODROME~~

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

22. New GM1 CAT.OP.MPA.181(c)(4) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(4) Fuel scheme — fuel planning and in-flight replanning policy

DESTINATION ALTERNATE AERODROME

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

23. New GM1 CAT.OP.MPA.181(c)(5) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(5) Fuel scheme — fuel planning and in-flight replanning policy

BASIC FUEL POLICY — FINAL RESERVE FUEL

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

— to provide a reference value to compare to preflight fuel planning computations, and for the purpose of a 'gross error' check; and

— to provide flight crews with easily referenced and recallable final reserve fuel figures to assist in in-flight fuel monitoring and decision-making activities.

24. New GM1 CAT.OP.MPA.181(c)(7) is introduced as follows:

GM1 CAT.OP.MPA.181(c)(7) Fuel scheme — fuel planning and in-flight replanning policy

ANTICIPATED DELAY — AEROPLANES

An anticipated delay is defined in fuel schemes as one that can be predicted based on the information provided by the airport authority and/or ATS provider before the flight has commenced. For example, scheduled maintenance work on a runway, which is likely to cause a delay to the normal flow of inbound traffic. It may be promulgated through either Notices to Airmen (NOTAMs), or via the aeronautical information publication (AIP), including a specific time and/or date of the anticipated delay.

25. New GM4 CAT.OP.MPA.181(d) is introduced as follows:

GM1 CAT.OP.MPA.181(d) Fuel scheme — fuel planning and in-flight replanning policy

IN-FLIGHT REPLANNING

In-flight replanning means voluntarily changing the final destination aerodrome or any alternate aerodrome or the rest of the route to the destination aerodrome after the flight has commenced when the flight could be completed as originally planned. In-flight replanning allows the operator, after flight commencement, to modify the filed flight plan. However, the modified flight plan should fulfil all requirements of a new flight plan. In-flight replanning may be used for commercial or other reasons. It also allows an advanced use of en route alternate (ERA) aerodromes in order to save fuel.

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

26. New AMC1 CAT.OP.MPA.183 is introduced as follows:

AMC1 CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes

BASIC FUEL SCHEMES — BASIC ALTERNATE AERODROME POLICY — AEROPLANES

(a) The take-off alternate aerodrome should not be further from the departure aerodrome than:

(1) for two-engined aeroplanes:

(i) 1 hour flight time at an one engine inoperative (OEI) cruising speed according to the aircraft flight manual (AFM) in international standard atmosphere (ISA) and still air standard conditions using the actual take-off mass; or

(ii) the extended-range twin operations ETOPS diversion time approved in accordance with Annex V (Part-SPA), Subpart F, to Regulation (EU) No 965/2012, subject to any minimum equipment list (MEL) restriction, up to a maximum of 2 hours at OEI cruising speed according to the AFM in ISA and still air standard conditions using the actual take-off mass;

(2) for aeroplanes with three or more engines, 2 hours flight time at an all-engines-operating cruising speed according to the AFM in ISA and still air standard conditions using the actual take-off mass.

(b) The operator should select in addition to the destination aerodrome at least one destination alternate aerodrome for each instrument flight rules (IFR) flight and specify it in the operational and ATS flight plans unless:

(1) the duration of the planned flight from take-off to landing or, in the event of in-flight replanning in accordance with CAT.OP.MPA.181(d), the remaining flying time to destination does not exceed 6 hours; and

(2) two separate runways are usable at the destination aerodrome, and the appropriate weather reports and/or forecasts for the destination aerodrome indicate that for the period from 1 hour before until 1 hour after the expected time of arrival at the destination aerodrome, the ceiling will be at least 2 000 ft (600 m) or the circling height +500 ft (150 m), whichever is greater, and the ground visibility will be at least 5 km.

(c) The operator should select and specify in the operational and air traffic services (ATS) flight plans two destination alternate aerodromes when:

(1) the appropriate weather reports and/or forecasts for the destination aerodrome indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival, the weather conditions will be below the applicable planning minima; or

(2) no meteorological information is available.

(d) To take advantage of:

(1) variations in the selection of aerodromes, the operator should fulfil specific criteria detailed in AMC2 CAT.OP.MPA.183; and

(2) individual fuel schemes that propose alternative means to selection of aerodromes, the operator should fulfil the criteria detailed in AMC3 CAT.OP.MPA.180.

27. New AMC1 CAT.OP.MPA.183(d) is introduced as follows:

AMC1 CAT.OP.MPA.183(d)&(e) Fuel scheme — selection of aerodromes policy — aeroplanes

BASIC FUEL SCHEMES — BASIC ALTERNATE AERODROME POLICY — AEROPLANES

(a) The operator should only select an aerodrome as a take-off alternate aerodrome or destination aerodrome other than an isolated destination aerodrome when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima specified in accordance with CAT.OP.MPA.110. The ceiling should be taken into account when a precision approach is not available. Any limitation related to one engine inoperative (OEI) operations shall also be taken into account.

(b) The operator shall only select the destination aerodrome when:

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

(i) RVR/visibility (VIS) specified in accordance with CAT.OP.MPA.110; and

(ii) for an NPA or a circling operation, the ceiling at or above MDH; or

(2) two destination alternate aerodromes are selected.

(c) The operator should only select an aerodrome as a destination alternate aerodrome, isolated aerodrome, or fuel en-route alternate (fuel ERA) aerodrome when the appropriate weather reports and/or forecasts indicate that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima of Table 1 below:

Table 1 — Planning minima

Destination alternate aerodrome, isolated destination aerodrome, fuel ERA aerodrome

Type of approach	**Planning minima**
Category III (CAT III) Category II (CAT II)	Category SA-CAT I: a DH not lower than 150 ft (45 m) and an RVR not less than 450 m; or Category I (CAT I): a DA/H not lower than 200 ft (60 m) and with either a visibility not less than 800 m or an RVR not less than 550 m.
Category SA-CAT I Category I (CAT I) LPV	First available Type A instrument approach, means an operation with a minimum DA/H or MDA/H at or above 250 ft (75 m). Ceiling should be at or above MDH.
First available Type A instrument approach	Next available Type A instrument approach; or if not available first available Type A instrument approach operation plus RVR/VIS +1000 m. Ceiling should be at or above MDH +200 ft.
Circling	Circling RVR/VIS should be +1000 m and ceiling at or above MDH +200 ft (60 m) .
Crosswind planning minima	
Gusts exceeding crosswind limits should be fully applied taking into account the runway conditions (dry, wet and contaminated).	

28. New AMC2 CAT.OP.MPA.183 is introduced as follows:

AMC2 CAT.OP.MPA.183 Fuel scheme — selection of aerodromes policy — aeroplanes

FUEL SCHEME WITH VARIATIONS — ISOLATED AERODROME — POINT OF NO RETURN

(a) An operator should consider a destination aerodrome as an isolated aerodrome if the alternate and final reserve fuel required to the nearest adequate destination alternate aerodrome is more than:

(3) for aeroplanes with reciprocating engines, the fuel to fly for 45 min plus 15 % of the flying time planned to be spent at cruising level or for 2 hours, whichever is less; or

(4) for turbine-engined aeroplanes, the fuel to fly for 2 hours at normal cruising consumption above the destination aerodrome, including the final reserve fuel.

(b) If the operator's fuel policy includes planning to an isolated aerodrome, the amount of usable fuel on board for departure should be as indicated in (1) or (2) below, whichever is greater.

(1) It should be the sum of:

(iii) taxi fuel;

(iv) trip fuel from the departure aerodrome to the isolated aerodrome, via the point of no return;

(v) contingency fuel calculated in accordance with the operator's current fuel scheme;

(vi) additional fuel, if required, but not less than:

(A) for aeroplanes with reciprocating engines, the fuel to fly for 45 min plus 15 % of the flight time planned to be spent at cruising level or for 2 hours, whichever is less; or

(B) for turbine-engined aeroplanes, the fuel to fly for 2 hours at normal cruising consumption above the destination aerodrome, which should not be less than the final reserve fuel;

(vii) extra fuel; and

(viii) discretionary fuel if required by the commander.

(2) It should be the sum of:

(i) taxi fuel;

(ii) trip fuel from the departure aerodrome to the en-route alternate (Fuel ERA) aerodrome, via the point of no return;

(iii) contingency fuel calculated in accordance with the operator's current fuel scheme;;

(iv) additional fuel, if required, but not less than:

(A) for aeroplanes with reciprocating engines, fuel to fly for 45 min; or

(B) for turbine-engined aeroplanes, fuel to fly for 30 min at holding speed at 1 500 ft (450 m) above the fuel ERA aerodrome elevation in standard conditions, which should not be less than the final reserve fuel;

(v) extra fuel; and

(vi) discretionary fuel if required by the commander.

29. New GM1 CAT.OP.MPA.183(b) is introduced as follows:

GM1 CAT.OP.MPA.183(b) Fuel scheme — Selection of aerodromes policy — aeroplanes

REACHING THE DESTINATION

In the context of fuel schemes and individual fuel schemes, reaching the destination means being as close as possible to the destination, but not necessarily overhead the destination, and no more than 1 hour away from the destination.

For isolated aerodromes, reaching the destination means being as close as possible to the destination but not at or farther away from the point of no return.

30. New GM1 CAT.OP.MPA.183(c) is introduced as follows:

GM1 CAT.OP.MPA.183(c) Use of isolated aerodromes — aeroplanes

NORMAL CRUISING CONSUMPTION

Normal cruising consumption is represented by the fuel consumption at the cruising flight level prior to top of descent.

31. GM1 CAT.OP.MPA.185 is amended as follows:

GM1 CAT.OP.MPA.~~185~~183 ~~Planning minima for IFR flights — aeroplanes~~Fuel scheme — selection of aerodromes policy — aeroplanes

PLANNING MINIMA FOR ALTERNATE AERODROMES (IFR flights)

Non-precision minima (NPA) in Table 1 of AMC1 CAT.OP.MPA.~~185~~183 mean the next highest minima that apply in the prevailing wind and serviceability conditions. Localiser only approaches, if published, are considered to be non-precision in this context. It is recommended that operators wishing to publish tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Any cases of unserviceability should, however, be fully taken into account.

(…)

32. The title of GM2 CAT.OP.MPA.185 is amended as follows:

GM2 CAT.OP.MPA.~~185~~183 ~~Planning minima for IFR flights — aeroplanes~~Fuel scheme — selection of aerodromes policy — aeroplanes

33. New AMC1 CAT.OP.MPA.185(a) is introduced as follows:

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

BASIC IN-FLIGHT FUEL MANAGEMENT POLICY — AEROPLANES

(a) In-flight fuel checks

(1) The commander should ensure that in-flight fuel checks are carried out in-flight at regular intervals, and should evaluate the usable remaining fuel to:

(i) compare actual consumption with planned consumption;

(ii) check that the usable remaining fuel is sufficient to complete the flight, in accordance with (b) below; and

(iii) determine the expected usable fuel remaining on arrival at the destination aerodrome.

(2) The relevant fuel data should be recorded.

(b) In-flight fuel management

(1) The flight should be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:

(i) the required alternate fuel plus the final reserve fuel; or

(ii) the final reserve fuel if no alternate aerodrome is required.

(2) If an in-flight fuel check shows that the expected usable fuel remaining on arrival at the destination aerodrome is less than:

(i) the required alternate fuel plus the final reserve fuel, the commander should request delay information from the air traffic control (ATC), and take into account the traffic and the operational conditions prevailing at the destination aerodrome, at the destination alternate aerodrome and at any other adequate aerodrome in deciding whether to proceed to the destination aerodrome or to divert so as to perform a safe landing with not less than the final reserve fuel; or

(ii) the final reserve fuel, if no destination alternate aerodrome is required, the commander should take appropriate action and proceed to an aerodrome where a safe landing with not less than the final reserve fuel can be performed.

(3) Additional conditions for specific procedures

(i) On a flight using the reduced contingency fuel (RCF) procedure to proceed to the destination 1 aerodrome, the commander should ensure that the usable fuel remaining at the decision point is at least the total of:

(A) trip fuel from the decision point to the destination 1 aerodrome;

(B) contingency fuel equal to 5 % of trip fuel from the decision point to the destination 1 aerodrome;

(C) destination 1 aerodrome alternate fuel if a destination 1 alternate aerodrome is required; and

(D) final reserve fuel.

(ii) On a flight using the predetermined point (PDP) procedure to proceed to the destination aerodrome, the commander should ensure that the usable fuel remaining at the PDP is at least the total of:

(A) trip fuel from the PDP to the destination aerodrome;

(B) contingency fuel from the PDP to the destination aerodrome; and

(C) additional fuel.

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

34. New GM1 CAT.OP.MPA.185 is introduced as follows:

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

Guidance on procedures for in-flight fuel management including reanalysis, adjustment and/or replanning considerations when a flight begins to consume contingency fuel before take-off is contained in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015).

35. New GM1 CAT.OP.MPA.185(a)(4),(b)&(c) is introduced as follows:

GM1 CAT.OP.MPA.185(a)(4),(b)&(c) Fuel scheme — in-flight fuel management policy — aeroplanes

PROTECTION OF FINAL RESERVE FUEL

The protection of final reserve fuel is intended to ensure a safe landing at any aerodrome when unforeseen occurrences may not permit the flight to proceed as originally planned.

When the final reserve fuel can no longer be protected, then a fuel emergency must be declared and any landing option explored (e.g. aerodromes not assessed by the operator, military aerodromes, closed runways), including deviating from rules, operational procedures and methods in the interest of safety.

Further detailed guidance for the development of a comprehensive in-flight fuel management policy and related procedures is contained in ICAO Doc 9976 —Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015).

Note: see Annex I (Definitions) for a definition of 'safe landing'.

36. New GM1 CAT.OP.MPA.185(b)(3) is introduced as follows:

GM1 CAT.OP.MPA.185(b)(3) Fuel scheme — in-flight fuel management policy — aeroplanes

DECLARATION OF MINIMUM FUEL

The declaration of MINIMUM FUEL informs the air traffic control (ATC) that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and that any change to the existing clearance may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible, should any additional delay occur.

Pilots should not expect any form of priority handling as a result of a MINIMUM FUEL declaration. The ATC should, however, advise the flight crew of any additional expected delays, as well as coordinate when transferring the control of the aeroplane, to ensure that other ATC units are aware of the flight's fuel state.

Guidance on declaring MINIMUM FUEL is contained in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual (1st Edition, 2015).

37. New AMC1 CAT.OP.MPA.196 is introduced as follows:

AMC1 CAT.OP.MPA.196 Refuelling with an engine running — aeroplanes

OPERATIONAL PROCEDURES

Refuelling with an engine running is extremely hazardous and should not normally be conducted.

(a) To reduce the likelihood of conducting such refuelling, the operator should include an operational procedure in the minimum equipment list (MEL) with regard to dispatch criteria in relation to an unserviceable auxiliary power unit (APU), if applicable, in order not to allow a flight to be dispatched to an aerodrome where no suitable ground support equipment is available.

(b) The operator's procedure should follow specific procedures established by the type certificate (TC) holder. If the TC holder has not established specific procedures for refuelling with an engine running, and the aircraft flight manual (AFM) does not forbid such operations, the operator should contact the TC holder and request the establishment of such procedures.

(c) Appropriate training should be provided to flight crew and maintenance/ground service personnel involved in the hot-refuelling procedure, as well as to cabin crew if to be present on board.

4. RIA

4.1. Issues to be addressed

4.1.1. Legislative background

ICAO rules

In 2008, ICAO recognised the need for updating and amending the fuel and alternate aerodrome selection provisions of its Annex 6. Many of these provisions remained unchanged since their introduction in the 1950s. Thus, a revision was considered necessary to enable air operators to take advantage of the latest technologies and operating practices in industry. A revision was eventually made and subsequent amendments were introduced into Annex 6 in 2012 and 2014 as follows:

— Amendment 36 to ICAO Annex 6, Part I (applicable as from 15 November 2012);

— Amendment 38 to ICAO Annex 6, Part I (applicable as from 13 November 2014);

— Amendment 33 to ICAO Annex 6, Part II (applicable as from 13 November 2014);

— Amendment 19 to ICAO Annex 6, Part III (applicable as from 13 November 2014); and

— the newly developed ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual.

The above-mentioned amendments changed, among others, the standards for fuel planning as well as the standards for the selection of alternate aerodromes and for meteorological conditions. Furthermore, in an effort to increase efficiency, they added requirements for the PIC so as to avoid a shortage of the usable fuel. That resulted in safety improvements and provided a performance-based environment. The changes also resulted in cost savings and environmental benefits. Amendment 36 to ICAO Annex 6, Part I is applicable as from 15 November 2012, followed by the rest of the Amendments, applicable as from 13 November 2014.

The ICAO Fuel Use Subgroup (FUSG), which reported to the ICAO Operations (OPS) Panel, also developed ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual, with its 1st Edition published in 2015. Said Document provides guidance material for the amended ICAO SARPS in ICAO Annex 6, Part I, by addressing specific safety risks associated with the selection of alternate aerodromes, as well as with fuel planning and fuel management.

Initiatives of the Agency

Air OPS Regulation

The Agency currently addresses fuel-related issues in the Air OPS Regulation, applying three independent policies, which may or may not be approved by the CA, namely:

(a) CAT.OP.MPA.150 accounts for the current fuel planning policy, which requires prior approval from the CA. It mandates the establishment of a fuel policy, which ensures the necessary fuel quantity to perform a safe flight. CAT.OP.MPA.150 is based on Regulation (EC) No 859/2008[17] (hereinafter referred to as the EU OPS Regulation), that is, OPS 1.255 of Appendix 1 and

[17] Commission Regulation (EC) No 859/2008 of 20 August 2008 amending Council Regulation (EEC) No 3922/91 as regards common technical requirements and administrative procedures applicable to commercial transportation by aeroplane.

OPS 1.255 of Appendix 2 thereto. In an attempt to move towards PBRs, the prescriptive Appendices 1 and 2 were transposed into corresponding non-binding AMC.

(b) CAT.OP.MPA.180, transposed from OPS 1.295, and CAT.OP.MPA.185, transposed from OPS 1.297 respectively, account for the policies related to the selection of aerodromes and they do not require prior approval from the CA. The current rules maintained the prescriptive approach of the EU OPS Regulation.

(c) CAT.OP.MPA.280 was transposed from OPS 1.375. It comprises the policy for in-flight fuel management and it does not require prior approval from the CA. The current rule maintained the prescriptive approach of the EU OPS Regulation.

The EU OPS Regulation is based on ICAO SARPS Annex 6, Part I, which, as described above, remained unchanged for many years.

SIB

Pursuant to the ICAO amendments, the Agency published SIB No 2013-12 'In-Flight Fuel Management — Phraseology for Fuel Related Messages to Air Traffic Control (ATC)' on 23 July 2013. After one MS raised the issue of European operators applying inconsistent procedures for hot refuelling, the Agency issued SIB No 2014-16 'Aeroplane Refuelling with One Engine Running' on 23 May 2014 in order to raise awareness. Furthermore, the Agency decided to tackle the issue of fuel planning through RMT.0573.

PBRs

Based on the Advance Notice of Proposed Amendment (A-NPA) 2014-12, which accounts for a policy initiative by the European Commission to identify the most appropriate ways to update and improve the Basic Regulation, this NPA (RMT.0573), comprising three sub-NPAs, will proposed a performance-based and integrated approach to fuel planning issues.

4.1.2. Problem areas

4.1.2.1 Implementation issues

CAT.OP.MPA.150, which accounts for the current fuel planning policy, contains most of the elements to be considered as a PBR, however, one of its elements, the safety objective, is missing in most of the items defining the policy. This could lead to problematic issues such as poor oversight, contradictions when developing or approving AltMoC, legal uncertainty etc.

CAT.OP.MPA.180 and CAT.OP.MPA.185, containing the current policies on selection of aerodromes, follow a prescriptive approach. That implies that they do not take into consideration how advanced or immature the operator's in-flight fuel management or fuel planning policy is. For instance, an operator with a conservative approach to fuel, which has a good planning system and policies that allow plenty of fuel reserves for holding due to any unforeseen circumstances, is nevertheless not able to benefit from a different policy. One reason is that it needs to plan its alternate aerodrome according to a type of approach above its current operational minima (e.g. from ILS CAT I to non-precision approach, see Table 1 of CAT.OP.MPA.185). On the other hand, an operator with a lean approach to fuel planning, which provides to the flight crew a deficient planning along with few fuel reserves for contingency, uses the same policy, creating a competitive advantage for itself and promoting behaviours that defy best practices. Additionally, the current prescriptive policies do not take into account neither whether the PIC is supported or not by the OCC nor the latest technologies available in modern aircraft, such as the capabilities offered by Flight Watch that provide a continuous update on the availability of aerodromes (landing options).

CAT.OP.MPA.280, describing the in-flight fuel management policy that does not need prior approval, also follows a prescriptive approach. The reasoning behind the implementation issues caused by the fact that the current in-flight fuel management policy follows a prescriptive approach is already described in the previous paragraph.

Furthermore, the fact that the above policies are independent causes the overall safety objective to be divided and therefore not properly understood and embraced by all stakeholders, leading to insufficient fuel policy implementation, deficient oversight and inability to achieve this overall safety objective.

Other implementation issues which need to be considered is the outdated ICAO term 'adequate alternate aerodrome', which was primarily used in the context of extended-range twin operations (ETOPS). Moreover, there are a number of definitions related to aerodromes (e.g. fuel ERA, take-off alternates etc.) that require to be aligned with the latest ICAO documentation. Finally, the term 'local conditions', used in the current AMC1 CAT.OP.MPA.150(b), needs to be further defined and clarified. ICAO recently acknowledged the issue and addressed it in its Doc 9976, Section 4.19.2, by providing the necessary clarification for the aforementioned term.

4.1.2.2 Efficiency issues

The current prescriptive requirements of the Air OPS Regulation do not allow efficiency gains in terms of fuel used for:

(a) taxi;

(b) trip;

(c) contingency; and

(d) an alternate:

  (1) go-around, or

  (2) aerodrome.

The residual effect of those prescriptive requirements is that the PIC is induced to carry a larger quantity of discretionary fuel than he would normally do if he could base his decision on operational decision-making tools for fuel planning and management, such as the ones described in ICAO Doc 9976 (i.e. Flight Following, Flight Monitoring and Flight Watch)[18]. Moreover, the operators that have already implemented the operational capabilities of Flight Following, Flight Monitoring and Flight Watch cannot benefit from them because their use is not yet enabled by the rules. Consequently, even though almost always aeroplanes land with more fuel than necessary, there are still occurrences where the aircraft lands with less than the minimum reserve fuel and thus there is a need for extra initial fuel. That extra fuel represents a waste of resources which amounts to 3 % of the fuel load per hour per kg.

[18] For a more detailed description of the operational decision-making tools for fuel planning and management, please refer to Section 1.1.4 of ICAO Doc 9976.

Furthermore, the regulatory restraint in using the above operational capabilities hinders the optimal decision-making of the flight crew.

4.1.2.3 Environmental issues

Inefficient fuel usage can have the following environmental effects:

— increased atmospheric emissions of carbon dioxide (CO_2) and nitrogen oxides (NO and NO_2) that cause warming of the troposphere and cooling of the stratosphere;

— particulates and cirrus clouds affecting the ozone layers in the atmosphere and consequently warming the surface of the earth;

— aircraft vapour trails that trigger the formation of cirrus clouds; and

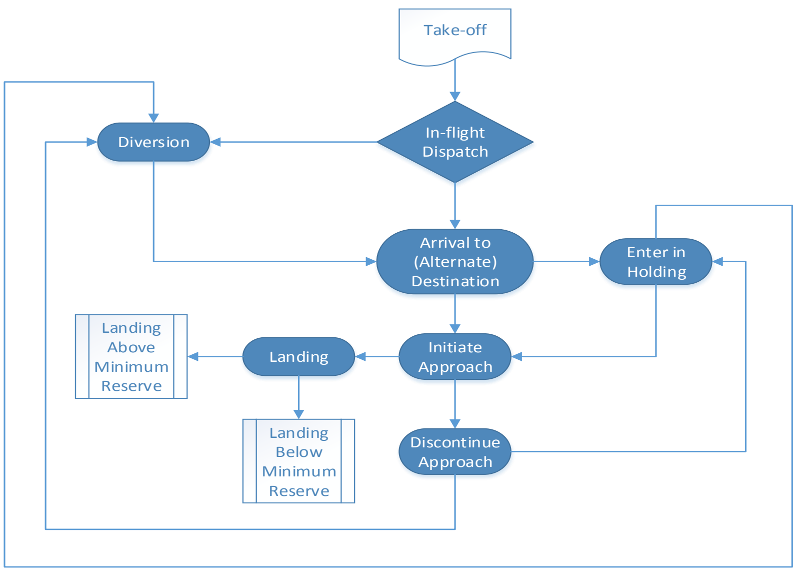
— decrease of the finite planetary resources, thus limiting the available energy supply[19].

4.1.3. Safety risk assessment

The proper management of the fuel on board during the flight is one of the identified safety issues in the operation of CAT aeroplanes. It is as such recognised in the Agency's CAT Aeroplane Safety Risk Portfolio (see EASA Annual Safety Review 2014). Fuel management does not only relate to the power of the flight crew to manage the fuel on board during the flight, but it also relates to the support the flight crew receives before and during the flight, as well as to the means for the flight crew to acquire and process the information relevant for their decision-making.

4.1.4. Operational decision-making

Figure 1 below depicts the operational flow in terms of decision-making when attempting an approach to the destination or diverting. It includes the practice promoted by SIB No 2013-12, as follows:



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.

The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

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.

EASA SIB 2013-12

Figure 1 — Operational-flow chart

19 Related information available at: http://www.eurocontrol.int/articles/environmental-issues-aviation

4.1.5. Safety Occurrences

Since 2012, several serious incidents or accidents due to low-fuel state have occurred worldwide, one of them being fatal. A list thereof is provided below:

— **10 July 2002**. Saab 2000, Swiss International Air Lines. Werneuchen, Germany. Accident. Adverse weather prevented landing at destination and at the subsequent several alternate airports. Landing on a former Soviet military airfield and collision with an earth embankment across the runway. No fatality.

— **17 July 2004**. Airbus A320, Martinair Holland N.V., Bremen, Germany. Incident. Adverse weather prevented landing at destination and alternates airports. Diversion to Bremen with fuel planned below the required final reserves. Uneventful landing.

— **14 June 2007**. Boeing B747-400, Cathay Pacific Airway, Rome, Italy. Incident. The aircraft could not perform the required CAT III landing and performed two go-arounds. Diversion in an emergency fuel condition. Uneventful landing with low-level fuel.

— **20 June 2008**. Airbus A340-600, Iberia, Cordoba, Argentina. Incident. The aircraft landed at SACO airport in a low-fuel-level situation after two consecutive diversions caused by unfavourable meteorological conditions.

— **10 February 2009**. Airbus A321, Deutsche Lufthansa, Stuttgart, Germany. Incident. Diversion after two missed approaches (strong crosswind) and landing with less than the minimum required fuel reserves.

— **26 July 2012.** Boeing B737-800, Ryanair and Airbus A340-300, Lanchile, Valencia, Spain. Incident. Due to adverse meteorological conditions (hailstorms) in Madrid, several aeroplanes diverted to Valencia Airport. Four of them, RYR2054, LAN705, RYR9VR and RYR5389, reported use of emergency fuel to the Valencia Airport ATC within a 14-min period, namely at 21:00, 21:04, 21:11 and 21:14, respectively. RYR2054 landed with less than the final reserve. Uneventful landing. Engine No 3 of LAN705 stopped in flight due to fuel starvation, thus landing with less than the required final reserves. No fatality. RYR9VR and RYR5389 performed uneventful landings.

— **12 July 2013**. Serious incident with a Boeing B787-8, Ethiopian Airlines, Heathrow Airport, London, United Kingdom. A ground fire in a parked and unoccupied Boeing B787-8 lead to the closure of the airport leading to numerous flight delays and aircraft diversions to other alternate aerodromes.

— **17 August 2013**. Boeing B757-236, Thomas Cook, Newcastle International Airport, Newcastle, United Kingdom. During a go-around, 'slat asymmetry' and 'flap disagree' messages appeared when the crew was trying to retract the flaps. A subsequent diversion to Manchester Airport was decided, where a landing was performed with less than the FRF.

— **7 October 2012**. Airbus A319-111, EasyJet, Ferenc Liszt International Airport, Budapest, Hungary. Incident. The scheduled flight from London to Budapest was on final approach after reaching the airspace of Budapest when the flight crew had to divert to an alternate aerodrome due to unfavourable weather conditions in the airspace and due to insufficient reserve fuel. After the diversion, they communicated that they wished to fly to Tirana Airport, and then they reported 'Fuel Emergency'. Subsequently, they corrected the destination from Tirana to Timisoara, but they invariably demanded landing priority. The aircraft was refuelled in Timisoara after a successful landing, and flew to Budapest Airport uneventfully.

— **12 July 2000**. Airbus A310-304, International Airport, Vienna, Austria. Incident. Shortly after the aircraft departed Chania, Greece, for a passenger flight to Hanover, Germany, the flight crew realised that the landing gear could not be retracted. The decision was made to continue the flight to Hanover at a lower altitude and airspeed with the landing gear extended. As the aircraft neared the midpoint of its journey, the crew realised that the remaining fuel would be insufficient to continue the flight to Hanover, so they planned to land at Vienna, Austria. As the aircraft descended at 10 000 ft, the left engine failed due to fuel exhaustion. By utilising cross-feed fuel pumps, the crew was able to keep the right engine running, but was unable to restart the left. As the aircraft turned a 6-mile final, the right engine also failed due to fuel exhaustion. The plane touched down 600 ft short of Runway 34, collapsing the main landing gear, and seriously damaging the left wing and engine. None of the 150 people on board received serious injuries.

— **12 November 2015**. Bae Avro RJ85, Cityjet, Belfast International Airport, Belfast, United Kingdom. Incident. The flight crew were unable to land at their destination, Dublin, due to high winds. They initiated a diversion to Belfast International Airport, but their approach there was delayed due to an area of poor weather affecting the airport. Once this cleared, the aircraft was able to land at Belfast although it did so with less that the required FRF remaining[20].

4.1.6. London Heathrow 12 July 2013 — closure of the airport

On the afternoon of Friday 12 July 2013, a ground fire in a parked and unoccupied Boeing B787-8 on Stand 592 at London Heathrow Airport lead to the closure of the two runways of the airport for about 90 min. This caused a large disruption, and numerous aircraft experienced lengthy airborne delays and diversions to available alternate aerodromes in the region.

In less than 1 hour, the main airline operating at Heathrow had 21 aircraft diversions. Many of these diversions were not to the planned alternate. None of the aircraft that diverted or those able to land after the incident at Heathrow landed with less than the FRF. Note: normal operations at Heathrow usually entail approximately 40 landings per hour using only two runways.

The RMG conducted a study, making the two following conclusions:

(a) Proper in-flight fuel management was a fundamental factor that led to a successful outcome during that day. The ATC provided good support and information to flight crew. Another enabler was the fact that the biggest operator in Heathrow provides a Flight Watch capability to its aircraft; the fairly good weather conditions[21] throughout the day were also helpful.

(b) FRF: the official information currently available to the RMG provides evidence to maintain the current alignment of the European rules with ICAO Annex 6, Part I, SARP 4.3.6.3(e) regarding the FRF. As mentioned above, no aircraft landed with less than the FRF, and data provided by the

[20] Aircraft Accident Investigation Board (AAIB) Bulletin: 4/2016: https://assets.digital.cabinet-office.gov.uk/media/56f16c5bed915d117a000026/BAe_Avro_RJ85_EI-RJH_04-16.pdf

[21] Minimum temperature of 12 °C, maximum temperature of 25 °C, no precipitation, barometric pressure adjusted to sea level (QNH) of around 1025 Pa, maximum wind speed of 13 km/h (7 kt).

main operator in Heathrow, disclosed to the RMG, do not contradict this fact. However, the Agency will continue to assess any evidence relevant to this matter (e.g. new incidents, research studies, etc.).

4.1.7. Valencia, 26 July 2012 — Four ‘fuel emergency’ declarations in 14 minutes

On 26 July 2012, at around 20:00 GMT, 17 aeroplanes from various airlines had to divert from Madrid Airport (LEMD) to Valencia Airport (LEVC) and Alicante Airport (LEAL) due to adverse meteorological conditions (hailstorms). A total of 12 aircraft were diverted to LEVC while 5 were diverted to LEAL.

Between 21:00 and 21:14, 4 aircraft declared ‘fuel emergency’ to Valencia Control (TACC (LECL)). All of them had previously performed a go-around at Madrid Barajas Airport[22] and then diverted to Valencia. Finally, all aircraft landed safely but two of them landed with less than the FRF, and one of them lost one engine due to fuel starvation.

According to the official report, all the operational flight plans were in compliance with the Air OPS Regulation; extra fuel was carried in all of them with the lowest being 283 kg, representing 7–8 min of flight for that aircraft type.

The RMG studied the several cases of fuel emergency situations related to the Spanish aerospace in the period adjacent to the event, concluding that all of them involved non-Spanish air operations certificates (AOCs).

The RMG concluded that the events were not due to an improper fuel planning policy but were caused by suboptimal flight management. In order to ensure a proper in-flight fuel management, flight watch or flight monitoring capabilities are of key importance. These services provide critical assistance and relevant safety information to the flight crew and, therefore, allow them to have better situational awareness and make early decisions (e.g. early diversions to the alternate aerodrome avoiding unnecessary go-arounds at destination).

4.1.8. Study of the fuel-related occurrences stored in the European Central Repository (ECR) and the EASA Internal Occurrence Reporting System (IORS) database[23].

In addition to the non-exhaustive list of the above-mentioned fuel-related occurrences, in order to depict the underlying risk, a safety analysis of fuel management has been carried out. The analysis comprises accidents and serious incidents, where the fuel on board became a concern to the flight crew during the flight. Although those events are classified as accidents or serious incidents, as defined in the Air OPS Regulation, they did not necessarily lead to emergency situations related to fuel, but they show how the decision-making process, as depicted in Figure 2 below, is vital for the prevention of undesirable events.

[22] Barajas Airport at that time was operating using south configurations, that is Runway 18R/L was used for both approach and landing.

[23] More information available at: http://www.easa.europa.eu/easa-and-you/safety-management/occurrence-reporting/legal-framework

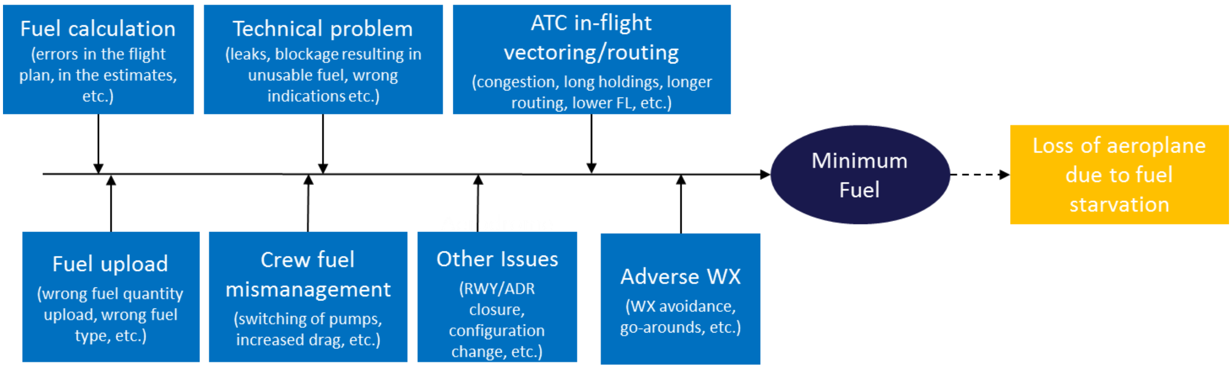


Figure 2 — Theoretical causes of a minimum-fuel scenario

In the study 53 serious incidents or accidents where reviewed (as per ICAO Annex 13 and Regulation (EU) No 996/2010[24] on the investigation and prevention of accidents and incidents in civil aviation), which are stored in the ECR and the EASA IORS database.

The selection criteria applied were the following two:

— the fuel on board becomes a concern for the flight crew, regardless of the cause; and

— the operation is conducted by a CAT aeroplane above 5 700 kg maximum take-off weight (MTOW).

The results of the analysis can be summarised as follows:

— There has been no accident due to fuel starvation in the last 10 years. The only occurrence classified as an accident in the analysed data set was the loss of control during a go-around after descending below weather minima.

— There are several causes leading to a situation where the fuel on board becomes a concern for the flight crew, as depicted in Figure 2 above. Data indicate the following causes as the most recurrent ones:

- weather (visibility, crosswinds, thunderstorms, wind shear) — 64 %;
- technical failures of the aircraft (fuel leaks, fuel system failures) — 18 %;
- aerodrome/runway closure (obstructed or closed runway, aerodrome closure) — 14 %;
- traffic management (vectoring, rerouting, conflicting clearance) — 11 %; and
- flight preparation (fuel calculation, aircraft performance, longer taxiing/waiting) — 5 %[25].

— There seems to be a direct relation between the decision to divert to the alternate aerodrome before initiating the approach to the destination and the lower probability of landing with less than the minimum reserve fuel. None of the cases where the crew decided to divert before

[24] 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).

[25] From the initial 53 occurrences, only for 44 of them a cause was determined by the investigation authorities. Therefore, the total number of occurrences above differs from the initial number. Additionally, for a few cases of the remaining 44, multiple causes were identified; hence, the sum of the percentages above exceeds 100%.

initiating the approach to the destination led to a landing with less than the minimum reserve fuel at the alternate aerodrome, while in 15 cases out of 26 diversions, the aircraft finally landed with less than the minimum reserve fuel on board.

— The standard phraseology, as promoted by ICAO SARPS and SIB No 2013-12, is not always used by the flight crew.

— The decision-making process applied by the flight crew is very much affected by the information made available to the flight crew at that moment, especially the actual conditions in alternate aerodromes and the dynamics of the scenario.

— When a high-traffic aerodrome is closed or heavily congested, there is a cascading effect of congestion in the closest alternate aerodromes, leading to an increased risk of fuel issues for the diverted aeroplanes.

— The go-around is a manoeuvre to ensure safety during the approach and landing phases. However, there have been several cases of mismanaged go-arounds that led to fatal accidents or incidents where the safety margins were significantly reduced. The management of the go-around is therefore identified as one of the main safety issues in the CAT aeroplane operation, listed as such in the Safety Risk Portfolio of that domain. In addition, as explained above, an early decision to divert may not only prevent the risk of having to fly a go-around but also a landing with less than the minimum reserve fuel.

4.1.9. General safety trends

Figure 3 below shows the distribution of those accidents and serious incidents in the 10-year time frame of the study, where there was a declaration of a fuel emergency of any kind (total number of occurrences depicted below: 42). Although there has been a slight increase in the last 4 years, the data set does not allow to draw any direct conclusion.

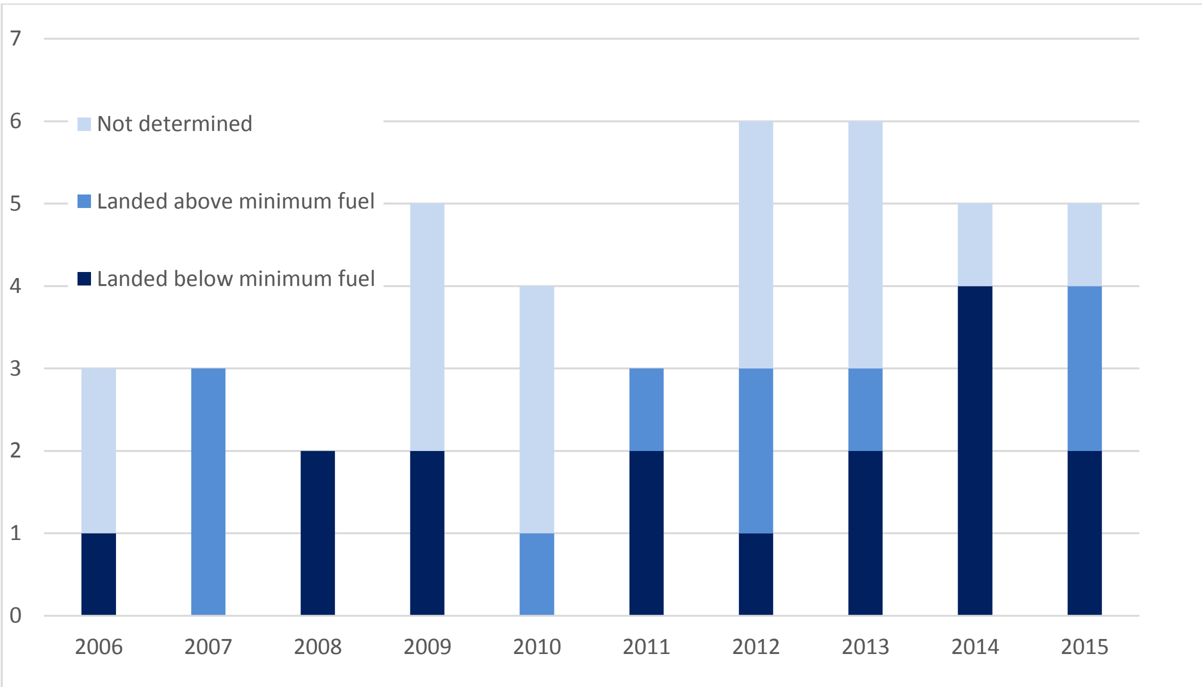


Figure 3 — Distribution of events involving a declaration of fuel emergency

4.1.10. General facts from the EU Survey 'RMT.0573 — Fuel Planning' sent to operators and NAAs in 2015

In an effort to describe the state of the art, the Agency launched a survey on fuel management and other fuel safety issues. The survey took place from 13 November 2015 to 4 March 2016, and it was addressed to air operators and NAAs. 47 responses were received: 4 from NAAs and 43 from air operators, 45 from European MSs and 2 from non-European. The participants did not respond to all questions, therefore, the total number of responses for each question in the survey may differ from question to question.

<u>General data on traffic and fuel safety issues</u>

The survey concluded that operators perform in total 1 200 000 flights per year, 24 % of which fly outside EASA MSs (EU-28 plus the EFTA countries: Iceland, Lichtenstein, Norway and Switzerland) (Questions 1.1 and 1.2.).

The Agency, focusing on the operational capabilities available for the decision-making process of the flight crew, requested information mainly about the new definitions introduced in ICAO Doc 9976:

— **Flight Following**: the recording in real time of departure and arrival messages by operational personnel to ensure that a flight is operating and has arrived at the destination aerodrome.

— **Flight Monitoring**: in addition to requirements defined for Flight Following, Flight Monitoring includes the:

- operational monitoring of flights by suitably qualified operational control personnel from the point of departure throughout all phases of flight;
- communication of all available and relevant safety information between the operational control personnel on the ground and the flight crew;
- provision of critical assistance to the flight crew in the event of an in-flight emergency or security issue or at the request of the flight crew.

— **Flight Watch**: in addition to all of the elements defined for Flight Following and Flight Monitoring, Flight Watch includes the active tracking of a flight by suitably qualified operational control personnel throughout all phases of the flight to ensure that it is following its prescribed route, without unplanned deviation, diversion or delay, and in order to satisfy State requirements.

According to the results of the survey, the majority of airlines use the Flight Following tracking system in their OCCs (45 % of the operators), followed by Flight Monitoring (27.5 % of the operators) and Flight Watch (22.5 % of the operators). The results also indicate that 50 % of European operators have already covered the costs that might be introduced if the new Regulation amending the Air OPS Regulation is adopted. Furthermore, the remaining 50 % accounts for small operators, which would not benefit from the use of individual fuel schemes.

Table 1 — Number of operators per type of OCC tracking system

Current OCC tracking system	Total
No response	5 %
Flight Following	45 %
Flight Monitoring (incl. Flight Following)	27.5 %
Flight Watch	22.5 %

Source: EU Survey 'RMT.0573 — Fuel Planning 2015', Question 2.2.2. — What kind of current tracking system is implemented in your OCC?

The Agency also requested information about the fuel planning policy per OCC tracking system. The majority of the operators use the 5 % fuel contingency, while only one of the participants uses SCF, allowing efficient fuel management. The detailed results are contained in Table 2 below.

Table 2 — Number of operators per type of fuel planning policy and OCC tracking system

OCC tracking system / Current fuel planning policy	Flight Following	Flight Monitoring	Flight Watch	Grand total
5 % contingency	15	5	7	27
5 % contingency 20-min contingency	1	1		2
5 % contingency 3 % contingency	1	1	1	3
5 % contingency 3 % contingency Decision point	1	1		2
3 % contingency 20-min contingency Decision point		1		1
3 % contingency Decision point		1		1
3 % contingency SCF		1		1
Decision point			1	1
Grand total	18	11	9	38

rce: EU Survey 'RMT.0573 — Fuel Planning 2015', Question 1.3 — Current fuel planning policy and Question 2.2.2

Additionally, the Agency requested information about the current fuel planning policies used by operators and the relative share (in %) of flights per type of fuel policy. 95 % of the flights use the fuel policy '5 % contingency'. The majority of the operators using several fuel policies also use the 5 % fuel contingency policy . Moreover, the survey indicated that none of the operators use the decision point fuel policy. Therefore, it was decided to remove it from the current fuel policy and add it to the isolated-aerodrome requirements instead since the decision point policy is not used unless there is an isolated-aerodrome flight. The detailed results are shown in Table 3 below:

Table 3 — Relative share of flights per type of fuel policy

Current fuel planning policy	***Number of operators***	***Relative share of these policies in terms of flights***				
		5 % contingency	**3 % contingency**	**20-min contingency**	**Statistical contingency**	**Decision point**
5 % contingency	21	100	0	0	0	0
5 % contingency **3 % contingency**	5	93	7	0	0	0
5 % contingency **20-min contingency**	2	90	0	10	0	0
3 % contingency **20 min contingency** **Decision-point**	1	0	96	>1	0	<3
5 % contingency **3 % contingency** **20 min contingency**	1	81	17	2	0	0
5 % contingency **3 % contingency** **Decision-point**	2	39/88[26]	60/10	0	0	1/2
5 % contingency **Decision point**	1	90	0	0	0	10
Grand total	**33**					

Source: EU Survey 'RMT.0573 — Fuel Planning 2015', Question 1.4 — Please specify relative share (in %) of the total flights using the fuel policy/policies above and Question 1.3

[26] 39/88 means that the one respondent answered that 39% of the time uses 5% contingency fuel while the other respondent answered that 88% of the time uses 5% contingency fuel. The same is valid for the whole row.

The Agency requested information related to the number of diversions to alternate aerodromes after a go-around above the destination aerodrome. Based on the results of the survey, the more the OCC tracking system service support increases, the less diversions occur, which means lower fuel consumption. The survey confirmed that the potential maximum number of diversions for an operator is the highest with Flight Following, it decreases with Flight Monitoring and it becomes even less with Flight Watch. Thus, the intend of the new requirements in terms of safety is to decrease the rate of go-arounds, inducing the crew to decide upon a possible diversion before the go-around. This reinforces what has been identified in the safety risk assessment of the analysis of accidents and serious incidents, namely the fact that an early and informed decision-making process reduces the number of diversions and their potential consequences. The detailed results are shown in Table 4 below:

Table 4 — Number of diversions per 100 000 flights and per type of OCC tracking system

Current OCC tracking system	*Total number of diversions per 100 000 flights*	*Total number of operators*
Flight Following	6 141	26
Flight Monitoring (incl. Flight Following)	2 014	9
Flight Watch	716	4

Source: EU Survey 'RMT.0573 — Fuel Planning 2015', Question 1.6 — Diversions to an alternate aerodrome after a go-around in destination has occurred, and Question 2.2.2

The Agency also attempted to gain some insight in the cause of the diversions occurred. The results confirm that weather is the main reason behind diversion, as also indicated by the safety risk assessment (see Section 4.4.9 — Study of the fuel-related occurrences stored in the ECR and in the IORS database). The detailed results are shown in Table 5 below:

Table 5 — Number of diversions to an alternate aerodrome in 2015 per cause

Diversions to an alternate aerodrome after a go-around in destination has occurred	***Due to weather***	***Due to ATC***	***Due to airborne equipment***	***Due to ground equipment***	***Due to other reasons***
1 116	914	117	60	23	2
100 %	82 %	10 %	5 %	2 %	0.2 %

Source: EU Survey 'RMT.0573 — Fuel Planning 2015', Question 1.7 — Please break the above number by reasons if possible

4.1.11. Who is affected?

This RMT would affect the following stakeholders:

— Air operators with motor-powered aircraft, for commercial as well as non-commercial operations:
  - pilots; and
  - flight dispatchers in the OCC;

— CAs overseeing air operators; and

— air traffic management (ATM) service providers since the selection of aerodromes will be more dynamic during flight, probably avoiding unnecessary go-arounds.

4.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This sub-NPA will contribute to the achievement of these objectives by addressing the issues outlined above (see Chapter 2).

The specific objectives of this RMT are, therefore:

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

  (1) addressing safety recommendation FRAN-2012-026;

  (2) transposing to the applicable requirements of the Air OPS Regulation the content of SIB No 2013-12; and

  (3) transposing to the applicable requirements of the Air OPS Regulation the content of SIB No 2014-16;

(b) to remain in compliance with ICAO SARPS by ensuring that the European rules are in compliance with the latest amendments to ICAO Annex 6, Part I, Part II and Part III, regarding fuel planning and in-flight management; and

(c) to propose efficient rules by:

  (1) clarifying the current applicable requirements regarding fuel planning, fuel refuelling procedures and in-flight fuel management;

  (2) ensuring consistency of fuel-related requirements across the applicable Annexes to the Air OPS Regulation for motor-powered aircraft, where appropriate;

  (3) ensuring the correct balance between the IR and AMC/GM on the subject issue; and

  (4) ensuring, whenever possible, an adequate environmental protection.

4.3. Policy options

3 Options have been developed.

Table 6 — Selected policy options

Option No	*Short title*	Description
0	Do nothing	Baseline option: no change in rules; risks remain as outlined in the issue analysis and the prescriptive requirements of the Air OPS Regulation remain unchanged.
1	Minimal changes	Fix editorial and small implementation issues, and offer the operators the choice between: (a) prescriptive requirements from Option 0; or (b) new requirements which would allow small benefits from the latest technologies and operating practices in industry related to fuel management (e.g. Flight Following or Flight Monitoring tracking system). This would allow a slight reduction in fuel for go-arounds and discretionary fuel.
2	PBRs	Offer the operators the choice between: (a) prescriptive requirements from Option 0; or (b) new requirements following the PBRs principles. The Flight Monitoring and Flight Watch tracking systems could be effectively used also for fuel management, with further potential reductions in fuel consumption compared to Option 1.

Options 1 and 2 provide flexibility to the operators, allowing them to decide either to continue applying the current prescriptive requirements or to implement the new ones, which leads to more efficient fuel management.

Table 1 provides an estimate of the number of operators using the different types of flight tracking systems in their OCCs. 44 % of the operators already use Flight Following, i.e. Option 1. Option 2 corresponds to Flight Monitoring and Flight Watch tracking systems, depending on the choice of the operators.

It is important to note that even if today an operator has a certain type of tracking system, the operator uses its tracking system for operational purposes other than fuel management due to the lack of flexibility in the current rules (Option 0).

4.4. Methodology and data

4.4.1. Applied methodology to compare the different impacts

The impacts of the different options are assessed against the following related criteria:

— safety;

— social impact;

— environmental protection;

— economic impact;

— General Aviation (GA) and proportionality for small and medium-sized enterprises (SMEs); and

— 'better regulation'[27] and harmonisation.

There are several possibilities to analyse the impacts and to compare the options:

— If all the required data is available, then a cost-benefit analysis (CBA) can be performed which quantifies all impacts in monetary terms: e.g. safety in terms of avoided fatalities and injuries, compliance costs for the industry, environmental costs. The outcome can be expressed in terms of a net present value or a benefit-cost ratio.

— Alternatively, cost-effectiveness analysis (CEA) can be performed if the (safety) target is given and the choice of options is limited to choosing the most cost-effective one.

— If no full monetisation is possible, a multi-criteria analysis (MCA) allows comparing all options by scoring them against a set of criteria. When a numeric scale is used, each criterion may receive a certain weight.

The MCA methodology was selected for this RIA because the impacts on safety, on proportionality of the requirements for SMEs and on the harmonisation with third countries cannot be monetised.

The MCA scale complexity will depend on the complexity of the impacts analysis. A scale using the signs '+', '–' and '0' was found adequate to highlight the differences between the impacts of each option.

4.4.2. Applied methodology for economic and environmental impacts

Due to the fact that a level playing field and environmental protection account for the main drivers of this RMT, a specific calculation was developed to quantify these impacts. Namely, a model table was created by the RMG in order to assess the scale of the **average** change in fuel consumption, depending on the type of flight (short/medium or long haul) and the type of fuel usage (taxi, trip, contingency, alternate, discretionary fuel, final reserve). A case study employing the above-mentioned model table for a short/medium flight of 2 hours is shown below.

Table 5 — Example of estimated fuel for a 2-hour flight in Europe using the baseline scenario

	Option 0 — Current requirements	
	Description	Fuel (in kg)
Total		**7 300**
Taxi	20-min taxi	**250**
Trip	2 h	**4 000**
Contingency	5 %	**200**

[27] More information available at: http://ec.europa.eu/smart-regulation/index_en.htm

Alternate		**1 550**
Go-around		500
Alternate airport		1 050
Discretionary fuel		**300**
Final reserve	For a 30-min international standard atmosphere (ISA) 1 500 ft above the alternate aerodrome	1 000

Note: regarding discretionary fuel, due to the limitation imposed by the current Air OPS Regulation, the operators are unable to provide an accurate fuel planning; as a consequence, PICs are generally tempted to load discretionary fuel.

Implementing Options 1 and 2 in the above case study would lead to a decrease in fuel requirements for nearly each item of the table:

— taxi: potential fuel decrease with Option 2;

— trip: potential fuel decrease with Option 2;

— contingency: potential fuel decrease with Options 1 and 2;

— alternate: potential fuel decrease with Option 2;

— discretionary: potential fuel decrease with Options 1 and 2; and

— fuel reserve: no effect.

How this fuel decrease is calculated is explained in Table 7 below, where Options 0 and 2 are compared to each other in the context of the above case study. The comparison concluded that Option 2 requires only 6 720 kg versus 7 300 kg of fuel required by Option 0.

Table 6 — Example of comparison between Option 0 and Option 2 (PBRs)

	Option 0 — Current requirements		**Option 2 — PBRs**			
		Fuel (in kg)		Fuel reduction	Flight share	Fuel (in kg)
Total		**7 300**				**6 720**
Taxi	20-min taxi	**250**				**200**
Trip	**2 m**	**4 000**	**Average**			**3 960**
			Relative share of the flights to get a 1-% reduction in fuel trip for short medium flights	1 %	100 %	3 960
			Relative share of the flights without a reduction in fuel trip	0 %	0 %	4 000

	Option 0 — Current requirements		Option 2 — PBRs			
		Fuel (in kg)		Fuel reduction	Flight share	Fuel (in kg)
Contingency	**5 %**	**200**	**Average**	Contingency %		**70**
			50 % of the flights will have a 40 % lower contingency fuel than 2.5 % contingency.	1 %	50 %	40
			The rest will be 2.5 %	2.5 %	50 %	100
Alternate		**1 550**				**1 460**
Go-around		500	**Average**			**428**
			5 % without go-around due to no alternate (i.e. no fuel)	100 %	5 %	0
			95 % without reduced fuel for a go-around	0 %	95 %	450
Alternate airport		1 050	**Average**			**1 010**
			Relative share of the flights with selection of alternate airport		95 %	1 050
			In 5 % of the flights, no selection of an alternate airport, but a need for additional fuel for 15-min holding, corresponding to 25 % of the final fuel reserve	25 %	5 %	250
Discretionary fuel		**300**	Reduction due to further confidence in the calculations of and continuous monitoring by the OCC			**140**
			Relative share of the flights with reduction of discretionary fuel		80 %	100
			Relative share of the flights without reduction of discretionary fuel		20 %	300
Final reserve fuel	For 30-min ISA 1 500 ft above the alternate	**1 000**				**1 000**

In the case study analysed above, Option 2 allows carrying 580 kg less fuel than what the current rules would allow. Additionally, one should take into account that one kg of fuel not yet consumed is an additional burden for the rest of the trip, which requires energy to be carried. The difference in fuel requirements between Options 0 and 2 is then assessed in terms of fuel burn savings. According to data from manufacturers of several medium and large aircraft types, it is assumed that for every 1 kg less aircraft weight, there is a 3 % less fuel burn per hour. Therefore, according to the case study, 580 kg multiplied by 3 % multiplied by 2 hours equals 17 kg less fuel burn per hour. The benefits of less fuel on board are presented in detail in Table 8 below.

Table 8 — Benefits of less fuel on board

Primary outcome		Option 2 versus Option 0
Fuel change in kg		580
Benefit evaluation — Approach with fuel burn savings		
Fuel burn savings in kg per hour	3%	17
Fuel burn savings in kg for the entire flight		35
Fuel burn savings in kg per min		0.290

The last line of the table above depicts the fuel burn savings estimated per min. This information will be used to calculate the general fuel savings, by multiplying it with the total duration of flights in min for specific geographic areas. The specific geographic area for this RIA includes internal flights inside the EASA MSs' area and international flights from/to countries outside the EASA MSs' area.

The above case study was based on short/medium-haul flights, however, another calculation for long-haul flights has also been performed (see Appendix 2).

4.4.3. Data collection

For the purpose of this RIA, some data was collected by the EU Survey on fuel planning (https://ec.europa.eu/eusurvey/runner/FuelPlanning2015). Furthermore, all the statistical data used in the economic impact assessment was retrieved from the Statistics and Forecasts Service (STATFOR) of the EUROCONTROL Agency (for more information, visit: https://www.eurocontrol.int/articles/statistics). Finally, for the purpose of the safety risk assessment, 53 serious incidents or accidents have been reviewed (as per ICAO Annex 13 and Regulation (EU) No 996/2010), stored in the ECR and the EASA IORS database).

4.5. Analysis of impacts

4.5.1. Safety impact

Option 0 — Do nothing

Safety is not the driver of this RMT. As indicated in Section 4.1.6 — Safety risk assessment above, the current safety risks are low and they should also remain low.

Option 1 — Minimal changes

No significant changes in the safety level are expected through the implementation of Option 1.

Option 2 — PBRs

Option 2 introduces new requirements which, when implemented by an operator, might have two potential consequences on safety:

— If an NAA does not perform a correct assessment of the operator's capability to implement the PBR on fuel management, there is the risk that the occurrences related to fuel management may increase. This potential consequence is not supposed to happen, however, the Agency through its oversight functions may support in identifying such cases of incorrect assessment.

— If Option 2 is correctly implemented by the operators using PBRs and by those using Flight Monitoring or Flight Watch, the number of diversions should decrease as indicated in Table 4 above, as well as the number of flights landed with less than the final reserve fuel.

Overall, Option 2 may have a range of impact from 0 to +:

— there is a neutral impact if operators decide to continue applying prescriptive fuel requirements; and

— there is potential for a positive safety impact, should operators decide to implement the PBRs.

Table 10 — Safety impacts

Type of impact	Option 0	Option 1	Option 2
Safety impact	0	0	0/+

4.5.2. Environmental impact

The Agency is committed to the strategies set out by the European Commission in Europe 2020[28], namely to ensure sustainable growth, by reducing greenhouse gas emissions and increasing energy efficiency.

Furthermore, ICAO, with its amendments introduced between 2013 and 2014), moved to a performance-based approach in an effort to allow flexibility in fuel planning and the selection of alternates. That has created a need for EU to align therewith.

The analysis summarised in Table 11 depicts the potential benefits of less fuel on board. Nevertheless, the operator's commercial strategy will determine if this smaller quantity of fuel will translate into a lower fuel burn. If the operator decides to increase the payload (higher number of passengers or higher cargo volume) using this smaller quantity of fuel, there are no environmental gains in terms of a lower fuel burn. There are no estimates regarding the possible choice of the operators' commercial strategy. Therefore, the environmental impacts remain qualitative.

[28] More information available at: http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/priorities/index_en.htm.

Option 0 — Do nothing

No significant change; however, due to lack of efficient fuel management, no contribution to the reduction of CO_2 emissions through fuel planning is expected.

Option 1 — Minimal changes

No significant changes.

Option 2 — PBRs

Impacts range from no change at all to significant lower fuel consumption and lower fuel emissions.

Table 11 — Environmental impacts

Type of impact	Option 0	Option 1	Option 2
Environmental impact	0	0	0/++

4.5.3. Social impact

N/a

4.5.4. Economic impact

Before describing the economic impact as such, a related efficiency issue should be clarified:

With Option 0, EASA MSs' operators may not reap efficiency gains through lower fuel consumption, which will impact negatively their competitiveness in international traffic outside the EASA MSs' area. Currently, in other parts of the world, flexible requirements are in place that allow an efficiency increase in the use of fuel. In that context, an efficiency gain is expected with Option 1, which would be even bigger with Option 2.

The principle applied when calculating the economic-impact has been explained in Section 4.4.2 above, and further in Appendices 1 and 2 below. When comparing Option 0 with the two other Options, the overall economic impact is based on the following:

— the fuel load savings[29]; and

— the fuel burn savings;

The detailed results of the analysis are shown in Table 14 below:

[29] The fuel load savings refer to the fuel savings that are generated only at the very first flight of an aircraft. Therefore, they account for a minor proportion of the total economic impact.

Table 14 — Economic impacts of Options 1 and 2 compared to Option 0, based on 2015 flights

General information for 2015	Value	Average min per flight		
Flights intra EASA MSs	6 907 486	84		
Flights from/to EASA MSs	1 458 576	312		
CS-25 aircraft fleet for EASA MSs (1.2.2016)	6 854			
Estimated aircraft fleet for flights intra EASA MSs	5 912			
Estimated aircraft fleet for flights from/to EASA MSs	942			
Cost of fuel in EUR/kg[30]	0.7			
Type of savings per flight	Option 1 vs Option 0		Option 2 vs Option 0	
	Short-haul flight	Long-haul flight	Short-haul flight	Long-haul flight
Fuel load savings in kg (only on the first flight)	100	400	580	4 625
Fuel burn savings in kg	6	156	35	1 804
Overall fuel savings in kg	106	556	615	6 429
Fuel burn savings in kg/min	0.05	0.20	0.29	2.31
	Option 1 vs Option 0		Option 2 vs Option 0	
	Short-haul flight	Long-haul flight	Short-haul flight	Long-haul flight
One-off fuel load savings in 1 000 t				
Fuel load savings per flights				
Total fuel burn savings per aircraft fleet type	0.6	0.4	3.4	4.4
Overall fuel load savings	1.0		7.8	
One-off fuel savings (million EUR) Overall fuel savings per fuel cost EUR/kg	0.7		5.5	
	Option 1 vs Option 0		Option 2 vs Option 0	
	Short-haul flight	Long-haul flight	Short-haul flight	Long-haul flight
Annual fuel burn savings in 1 000 t				
Fuel burn savings per flights per average duration				
Total fuel burn savings per type of flight	29	91	168	1 053
Overall fuel burn savings	120		1 221	
Annual fuel burn savings (million EUR) (overall fuel savings per fuel cost EUR/kg)	84		855	

[30] Standard inputs for EUROCONTROL Cost-Benefit Analyses, Edition 7.0, November 2015

Option 0 — Do nothing

There is no economic impact on operators and NAAs if the current requirements remain.

Option 1 — Minimal changes

Minimal changes in rules will bring minimal benefits to those operators willing to make use of the proposed new rules' flexibility. According to the case study analysed in Table 14 above, the average potential gain with Option 1 would be 6 kg of fuel per short/medium flight, i.e. 0.05 kg/min. As for a long-haul flight, the average potential gain would be 156 kg, i.e. 0.2 kg/min. The reason for this considerable difference between short/medium-haul and long-haul flights is the fact that less fuel on board for a longer period of time leads to lower fuel burn.

If this fuel reduction were to be applied to all flights in 2015 taken into account in the above analysis, the maximum fuel reduction would be 120 000 t for the EU MSs' operators.

If the operators had decided to reduce the fuel on board, but not to increase the payload, they would have saved approximately EUR 84 million in 2015. If they had decided to increase the payload, an even greater economic benefit would have been expected. In addition, the operators would have saved on the first year EUR 0.7 million due to the fuel load saving.

With respect to the NAAs, it might be the case that they will need to provide further training to their staff to be able to assess such operators' fuel management plans and to perform an effective oversight. However, this is considered to be a non-significant impact within Option 1 due to the limited change in the requirements.

Option 2 — PBRs

As depicted in the Table 14 above, the average potential gain of Option 2 would be 35 kg per short/medium-haul flight, i.e. 0.29 kg/min, and 1 804 kg per long-haul flight, i.e. 2.31 kg/min.

If this fuel reduction were to be applied to all flights in 2015 taken into account in the above analysis, the maximum fuel reduction would be 1 221 000 t for the EU MSs' operators.

If the operators had decided not to increase the payload in relation with this fuel load reduction, they would have saved approximately EUR 855 million in 2015. If they had decided to increase the payload, an even greater economic benefit would have been expected. In addition, the operators would have saved on the first year EUR 5.5 million due to the fuel load saving.

With respect to the NAAs, it might be the case that they will need to provide further training to their staff to be able to assess such operators' fuel management plans and to perform an effective oversight. However, this is considered to be a non-significant within Option 2.

Table 15 — Economic impacts

Type of impact	Option 0	Option 1	Option 2
Economic impact	0	0/+	0/++

4.5.5. GA and proportionality issues

GA is not considered in this sub-NPA. The scope of this Section is therefore limited to small-CAT operators.

Option 0 — Do nothing

No change.

Option 1 — Minimal changes and Option 2 — PBRs

If the number of flights per operator can be considered as an indicator of the operator's size, it can be noticed from the following Table 16 that Flight Monitoring and Flight Watch are used mostly by small operators operating less than 10 000 flights per year. Consequently, both Option 1 and Option 2 will not prevent small operators from benefitting from the performance based fuel requirements, should they decide to implement them.

Table 16 — Operator size per type of OCC flight tracking system

Number of flight (ranges)	*Flight following*	*Flight following/ Flight monitoring*	*Flight monitoring*	*Flight watch*	*Other**	*Grand total*
0-1 000	5		1	4		**10**
1 000–10 000	7		6	1		**14**
10 000–50 000	4	1	1	2		**8**
> 50 000	2		1	1	1	**5**
Grand total	**18**	**1**	**9**	**8**	**1**	**37**

Table 17 — Proportionality impacts

Type of impact	Option 0	Option 1	Option 2
Impact on GA and proportionality	0	0/+	0/+

4.5.6. Impact on 'better regulation' and harmonisation

Option 0 — Do nothing

No change.

Option 1 — Minimal changes

Option 1 is partially compliant with ICAO by authorising a minor improvement in terms of fuel management.

Option 2 — PBRs

Option 2 is fully compliant with ICAO by enabling the operators to implement effective fuel management policies.

Table 16 — Safety impacts

Type of impact	Option 0	Option 1	Option 2
Impact on 'better regulation' and harmonisation	0	0/+	+

4.6. Comparison and conclusion

4.6.1. Comparison of options

Table 17 — Overall summary of impacts

Type of impact	Option 0	Option 1	Option 2
Safety impact	0	0	0/+
Environmental impact	0	0/+	0/++
Economic impact	0	0/+	0/++
Impact on GA and proportionality	0	0/+	0/+
Impact on 'better regulation' and harmonisation	0	0/+	+
Overall impact	**0**	**0/+**	**0/++**

Option 2 has overall the highest potential in terms of benefits. No adverse consequences for the operators are expected since only those willing to implement the PBRs will benefit therefrom. The NAAs may need to provide further training to their staff to better assess such operators' fuel management plans, and to perform a more effective oversight. However, this is considered to be a minor negative impact.

Note for stakeholders

Stakeholders are invited to participate in the following survey https://ec.europa.eu/eusurvey/runner/FuelPlanning2015 and provide their feedback on the economic assessment of Option 2 with respect to the following:

— fuel burn savings calculation;

— costs borne by the operators for implementing a specific OCC tracking system and fuel management policy; and

— training costs or other costs borne by the NAAs for assessing an operator's fuel scheme.

4.6.2. Monitoring and ex post evaluation

The following is a list of indicators to support monitoring and ex post evaluation:

— fuel-related safety events;

— number of operators per type of fuel management policy;

— number of diversions after a go-around at destination;

— number of flights without an alternate; and

— number of operators having decided to benefit directly from the fuel reduction instead of increasing the payload.

The proposal of this sub-NPA will be subject to interim/ongoing/ex post evaluation, indicating how well the amended rules have been performing, taking account of this impact assessment’s predictions.

5. References

5.1. Affected regulations

— Commission Regulation (EU) No 965/2012 of 28 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)

5.2. Affected 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 2014/014/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Regulation (EU) No 965/2012 and repealing Decision 2012/016/R of the Executive Director of the Agency of 24 October 2012 'AMC and GM to Part-ARO — Issue 2'

— 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'

5.3. Reference documents

— ICAO Annex 6 to the Chicago Convention on International Civil Aviation — Operation of Aircraft, Chicago, 7 December 1944

— ICAO Document 9976 — Flight Planning and Fuel Management Manual, 1st Edition, 2015

— ICAO State letter 10/2012, subject to the adoption of Amendment 36 to ICAO Annex 6, Part I, 4 April 2012 (ref.: AN 11/1.3.25-12/10)

— ICAO State letter 09/2014, subject to the adoption of Amendment 38 to ICAO Annex 6, Part I, 7 April 2014 (ref.: AN 11/1.3.27-14/9)

— ICAO State Letter 10/2014, subject to the adoption of Amendment 33 to ICAO Annex 6, Part II, 7 April 2014 (ref.: AN 11/6.3.27-14/10)

— ICAO State Letter 11/2014, subject to the adoption of Amendment 19 to ICAO Annex 6, Part III, 7 April 2014 (ref.: AN 11/32.3.11-14/11)

— ICAO Doc 4444, Procedures for Air Navigation Services – Air Traffic Management, ATM/501, March 1946

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

— Federal Aviation Administration (FAA) — Economic Values for FAA Investment and Regulatory Decisions, 2007

— EASA Safety Information Bulletin (SIB) No 2013-12 ‘In-Flight Fuel Management — Phraseology for Fuel Related Messages to Air Traffic Control (ATC)’, 23 July 2013

— EASA Safety Information Bulletin (SIB) No 2014-16 ‘Aeroplane Refuelling with One Engine Running, 23 May 2014, (1 July 2014 — correction)

6. Appendices

6.1. Appendix 1 — Fuel consumption and fuel burn estimates for short/medium flights

Table 18 — Fuel consumption and fuel burn estimates for short/medium flights

Estimates for a 2-h flight Paris–Madrid, source: RMG RMT.0573

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		Fuel (kg)		Fuel (kg)		*Fuel reduction*	*Flight share*	Fuel (kg)
Total		**7 300**		**7 200**				**6 720**
Taxi	20-mn taxi	**250**		**250**				**200**
Trip	**2**	**4 000**		**4 000**	**Average**			**3 960**
					Relative share of the flights to get a 1-% reduction in fuel trip for short medium flights	*1 %*	*100 %*	3 960
					Relative share of the flights without reduction in fuel trip	*0 %*	*0 %*	4 000
Contingency	**5 %**	**200**		**200**	**Average**	*Contingency %*		**70**
					Relative share of the flights to get a 1 % reduction in fuel trip	*1.0 %*	*50 %*	40.00
					The rest will be 2.5 %	*2.5 %*	*50.0 %*	100
Alternate		**1 550**		**1 500**				**1 460**
Go-around		*500*		*450*	**Average**			**428**

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		Fuel (kg)		Fuel (kg)		*Fuel reduction*	*Flight share*	Fuel (kg)
					5 % without go-around due to no alternate (i.e. no fuel)	*100 %*	*5 %*	0
					95 % without reduced fuel for go-around	*0 %*	*95 %*	*450*
Alternate airport		*1 050*		*1 050*	**Average**			***1 010***
					Relative share of the flights with selection of alternate airport		*95 %*	*1050*
					5 % of the flights will not need to select an alternate airport; in this case, additional fuel for 15-mn holding is needed, correspon-ding to 25 % of the final reserve fuel	*25 %*	*5 %*	*250*
Discretionary fuel	Due to the limitation of the current EU regulation, operators are unable to provide accurate fuel planning. As a consequence,	**300**	Reduction due to higher confidence in the calculations	**250**	Reduction due to further confidence in the calculations and continuous monitoring by the OCC			***140***

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		Fuel (kg)		Fuel (kg)		*Fuel reduction*	*Flight share*	Fuel (kg)
	PICs are tempted to load discretionary fuel.							
					Relative share of the flights with a reduction of the discretionary fuel		80 %	100
					Relative share of the flights without a reduction of the discretionary fuel		20 %	300
Final reserve	For 30-mn ISA 1500 ft above the alternate	**1 000**		**1 000**				**1 000**
Primary outcome								
Fuel change (kg)		0		100				580
Benefit valuation — Approach with fuel burn savings								
Fuel burn savings (kg) per h	3 %	0		3				17
Fuel burn savings (kg) for the flight				6				35
Fuel burn savings in kg per min				0.050				0.290

6.2. Appendix 2 — Fuel consumption and fuel burn estimates for long haul flight

Table 19 — Fuel consumption and fuel burn estimates for long-haul flights

Example with flight London–Buenos Aires, sourceRMG RMT.0573

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		fuel (kg)		fuel (kg)		*Fuel reduction*	*Flight share*	*Fuel (kg)*
Total		**112 846**		**112 446**				***108 221***
Taxi	20-mn taxi	**600**		**500**				***500***
Trip	**13**	**99 854**		**99 854**	***Average***			***99 554***
					Relative share of the flights to get 1-% reduction in fuel trip	*1 %*	*30 %*	*98 855*
					Relative share of the flights without areduction in fuel trip	*0 %*	*70 %*	*99 854*
Contingency	**5 %**	**4 993**		**4 993**	***Average***	*Contingency %*		***1 428***
					Relative share of the flights to get 100 kg	*0.1 %*	*30 %*	*100*
					Relative share of the flights to get a 2-% reduction in fuel trip	*2.0 %*	*70.0 %*	*1 997*
Alternate		**3 438**		**3 338**				***3 208***
Go-around		*800*		*700*	***Average***			***632***

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		fuel (kg)		fuel (kg)		*Fuel reduction*	*Flight share*	*Fuel (kg)*
					5 % without a go-around due to no alternate (i.e. no fuel)	*100 %*	*5 %*	*0*
					95 % without reduced fuel for a go-around	*0 %*	*95 %*	*665*
Alternate airport		*2 638*		*2 638*	***Average***			***2 543***
					95 % of the flights will need a selection of an alternate aerodrome		*95 %*	*2638*
					5 % of the flights will not need to select an alternate aerodrome; in this case, additional fuel for 15-mn holding will be needed, corresponding to 25 % of the final reserve fuel	*25 %*	*5 %*	*740*

	Option 0 — Current requirements		Option 1 — Minimal changes (flight following)		Option 2 — PBR			
		fuel (kg)		fuel (kg)		*Fuel reduction*	*Flight share*	*Fuel (kg)*
Discretionary fuel	Due to the limitation imposed to the operators by the current EU regulations, they are unable to provide an accurate fuel planning; therefore, PICs lose confidence in the system, thus they are usually tempted to load discretionary fuel.	**1 000**	Reduction due to higher confidence in the calculations	**800**	*Reduction due to further confidence in the calculations and continuous monitoring by the OCC*			***440***
					Relative share of the flights with a reduction of the discretionary fuel		*80 %*	*300*
					Relative share of the flights without a reduction of the discretionary fuel		*20 %*	*1 000*
Final reserve	For 30-mn ISA 1500 ft above the alternate.	**2 961**		**2 961**				***2 961***
Primary outcome								
Fuel change (kg)		0		400				*4 625*
Benefit valuation - Approach with fuel burn savings								
Fuel burn savings (kg) per h	3 %	0		12				*139*
Fuel burn savings (kg) for the flight				156				*1 804*
Fuel burn savings in kg per min				0.200				*2.313*

6.3. Appendix 3 — Average duration of flights

Breakdown by geographical zone	**Total number of flights**			**Total flight duration (in min)**			**Average min per flight**		
Flights intra for EU28+CH+IS+NO	**2005**	**2010**	**2015**	**2005**	**2010**	**2015**	**2005**	**2010**	**2015**
Total	**7 290 174**	**7 018 012**	**6 907 486**	**542 762 368**	**549 666 727**	**578 297 896**	**74**	**78**	**84**
Breakdown by geographical zone	**Total number of flights**			**Total flight duration (in min)**					
Flights to/from EASA MSs (EU 28+CH+IS+NO)	**2005**	**2010**	**2015**	**2005**	**2010**	**2015**	**2005**	**2010**	**2015**
Total	**1 189 655**	**1 404 307**	**1 458 576**	**370 297 757**	**426 419 600**	**455 381 316**	311	304	312
North America–EASA	344 169	346 610	374 806	153 800 820	157 311 077	169 769 367	447	454	453
South America–EASA	39 418	46 510	52 063	23 469 843	28 541 486	32 764 235	595	614	629
Africa–EASA	259 870	314 546	293 622	57 247 912	66 743 827	63 743 276	220	212	217
Middle-East–EASA	251 177	324 026	338 826	67 507 202	88 450 724	98 106 294	269	273	290
Russia–EASA	123 900	177 946	201 489	19 528 207	30 106 302	34 427 870	158	169	171
Far East (Asia)–EASA	171 121	194 669	197 770	48 743 773	55 266 184	56 570 274	285	284	286