European Aviation Safety Agency

Notice of Proposed Amendment 2016-06 (C)

Fuel planning and management

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

RMT.0573 — 15.7.2016

EXECUTIVE SUMMARY

This sub-Notice of Proposed Amendment (sub-NPA) addresses a proportionality and 'level playing field' issue related to fuel planning and management for non-commercial air operations.

The specific objective of this sub-NPA is to reduce the economic burden on operators and achieve harmonisation with the International Civil Aviation Organization (ICAO), where possible, without reducing the safety level in the context of fuel planning and management.

This sub-NPA proposes different measures for non-commercial air operators of complex motor-powered aircraft (Part-NCC), specialised operations (Part-SPO) and non-commercial air operators of other-than-complex motor-powered aircraft (Part-NCO). For Part-NCC and Part-SPO, the proposed amendments will improve alignment of Part-NCC and Part-SPO fuel planning requirements with the commercial air transport operations (Part-CAT) basic fuel scheme. For Part-NCO, the proposed amendments to fuel planning requirements reflect a performance- based approach in aviation regulation by replacing prescriptive rules with rules based on safety objectives, as well as with appropriate acceptable means of compliance (AMC)/guidance material (GM). For all, Part-NCC, Part-SPO and Part-NCO, in-flight fuel management requirements are aligned with ICAO Annex 6, Part II.

Note: Although ICAO Annex 6 is not applicable to aerial work (Part-SPO), for consistency reasons, it was decided that Part SPO will follow the Part-NCC approach.

The proposed changes are expected to reduce regulatory burden, increase cost-effectiveness, and improve harmonisation both with ICAO and the other Annexes to Regulation (EU) No 965/2012, while maintaining an adequate level of safety.

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-NCO &Part-SPO

Applicability		Process map	
Affected regulations and decisions:	— Annex VI (Part-NCC); — Annex VII (Part-NCO); — Annex VIII (Part-SPO) to Regulation (EU) No 965/2012; — ED Decision 2013/021/R; — ED Decision 2014/016/R; — ED Decision 2014/018/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
		Review group (RG):	Yes
		Focused consultation:	Yes
		Opinion expected publication in:	2017/Q3
		Decision expected publication in:	2018/Q4
Affected stakeholders:	Flight crew; air operators; national aviation authorities (NAAs)		
Driver/origin:	Level playing field		
Reference:	Safety Recommendation FRAN-2012-026 (BEA)		

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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 based on the input of the General Aviation (GA) Rulemaking Subgroup RMT.0573. It is hereby submitted for consultation of all interested parties[3].

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 sub-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 sub-NPA

Please submit your comments using the automated **comment-response tool (CRT)** available at http://hub.easa.europa.eu/crt/[4].

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[5] (hereinafter referred to as the 'Air OPS Regulation'),

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

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

5 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).

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 AMC/GM.

2. Explanatory note

2.1. Overview of the issues to be addressed

2.1.1. Part-NCC and Part-SPO

Annex VI (Part-NCC) to the Air OPS Regulation contains rules for fuel planning and management for complex motor-powered aircraft conducting non-commercial operations. It has already been implemented in some Member States (MSs), but will become applicable in most of them as of 25 August 2016.

Annex VIII (Part-SPO) to the Air OPS Regulation contains rules for fuel planning and management for any specialised operation where the aircraft is used for specialised activities. It has already been implemented in some MSs, but will become applicable in most of them as of 21 April 2017.

No experts were nominated for RMG RMT.0573 by the community of NCC or SPO operators.

While the GA Rulemaking Subgroup RMT.0573 was performing an analysis of issues related to Part-NCO, the group of NCC operators[6] designing an operations manual template for Part-NCC identified a number of issues in the existing rule text of Part-NCC. The GA Rulemaking Subgroup RMT.0573, therefore, identified a number of regulatory options for NCC, which are elaborated in this sub-NPA.

Additionally, this sub-NPA's proposals aim at improving consistency with ICAO standards and recommended practices (SARPs), as well as across all Annexes to the Air OPS Regulation; for that reason, Part-SPO was also included.

For a more detailed analysis of the issues addressed by this proposal, please refer to the related RIA Section 4.1. — Issues to be adressed.

2.1.2. Part-NCO

Annex VII to the Air OPS Regulation (Part-NCO) contains rules for fuel planning and management for other-than-complex motor-powered aircraft conducting non-commercial operations. It has already been implemented in some MSs, but will become applicable in most of them as of 25 August 2016.

In response to the European GA Safety Strategy, the GA community identified NCO.OP.125-7 and, especially, NCO.OP.185 as requirements that are inconsistent with the principles of this Safety Strategy and the Agency's performance-based approach with regard to regulating. In particular:

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

— the rules are in effect aimed at achieving a level of safety appropriate for CAT operations, which is disproportionate in the context of GA operations.

For a more detailed analysis of the issues addressed by this proposal, please refer to the related RIA Section 5.1. 'Issues to be adressed'.

[6] This Group was created in 2015 after a GA NAA-Safety Standards Consultative Committee and its sub-committees (SSCC)-combined meeting with representatives of industry and two NAAs.

Amendments to Annex VII (Part-NCO) to the Air OPS Regulation also cater for the use of electric propulsions systems.

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 the overall objectives by addressing the issues outlined in Chapter 2 of this sub-NPA.

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

2.3. Summary of the RIA

2.3.1. Part-NCC and Part-SPO

The RIA examined the possibilities of transposing into Part-NCC rules from Part-NCO, from the basic fuel scheme of Annex IV to the Air OPS Regulation (Part-CAT), or from ICAO Annex 6, Part II, Chapter 3. It indicates that the last two options would have the most positive impact, with a slight preference for alignment of Part-NCC with Part-CAT, which in turn is, to a substantial degree, aligned with ICAO Annex 6, Part II, Chapter 3. Alignment of Part-NCC with Part-CAT is therefore the Agency's preferred option.

Part-SPO is included in the Part-NCC RIA for consistency reasons. Currently, Part-SPO and Part-NCC are fully aligned in terms of fuel planning and selection of destination alternates, therefore, changes to Part-NCC imply analogous changes to Part-SPO. Consequently, the same amendments are proposed for Part-SPO as for Part-NCC, even thought ICAO Annex 6, Part II at Amendment 33 is not directly applicable to aerial work (SPO).

2.3.2. Part-NCO

The RIA identified major economic and GA proportionality benefits associated with an amendment to a safety-objective-based rule, and minor environmental and harmonisation benefits. Based on the safety analysis performed, there is no anticipated change to the safety performance.

2.4. Overview of the proposed amendments

2.4.1. Part-NCC and Part-SPO

The fuel planning policy for Part-NCC and Part-SPO air operators has been replaced by the basic fuel scheme introduced into Part-CAT. This is also broadly consistent with the requirements of ICAO Annex 6, Part II, Chapter 3.4.3.5. The Part-NCC and Part-SPO policy for destination alternates has been maintained as it differs significantly from the Part-CAT scheme for destination alternates.

The in-flight fuel management requirements of ICAO Annex 6, Part II, Chapter 3.4.3.6 have been transposed into Part-NCC and Part-SPO. These requirements are also consistent with the comparable requirements of Part-CAT.

NCC.OP.105 and SPO.OP.105 have been revised for consistency with a change to Part-CAT. A pilot-in-command need not consider an aerodrome as isolated if sufficient fuel is carried to reach a weather-permissible destination alternate aerodrome.

NCC.OP.130 and SPO.OP.130 have been replaced with requirements analogous to those of Part-CAT:

— a high-level safety-objective-based rule requiring the operator to establish a fuel scheme; and

— a framework fuel scheme (the detailed fuel scheme is set out in the related AMC).

NCC.OP.205 and SPO.OP.205 — In-flight fuel management have been adapted to be aligned with Part-CAT and Part-NCO.

NCC.OP.205(b) and SPO.OP.205(b) have been adapted to be consistent with Part-CAT and Part-NCO, now referring to 'final reserve fuel (FRF)'.

NCC.OP.205(c) and (d) and SPO.OP.205(c) and (d) have been added to introduce the 'MINIMUM FUEL' and 'MAYDAY MAYDAY MAYDAY FUEL' broadcasts.

2.4.2. AMC/GM to Part-NCC and Part-SPO

AMC1 NCC.OP.130 and AMC1 SPO.OP.130 have been transposed from the Part-CAT basic fuel scheme. GM relevant to the basic fuel scheme is also transposed from Part-CAT. Further explanation of the 'basic fuel scheme' details is available in the Explanatory Note of sub-NPA (A).

2.4.3. Part-NCO

The prescriptive requirement for a specific number of minutes of FRF has been replaced by a safety-objective-based rule, as well as a set of criteria to be used by the pilot-in-command in determining the quantity of FRF to be carried. Default values are given in the related AMC.

The requirements for in-flight fuel management have been adapted and updated to be aligned with the respective ICAO requirements.

NCO.OP.125(a) has been inserted to provide a performance-based safety objective. It is a slightly modified version of the essential requirement 2.a.7 of Annex IV to the Basic Regulation.

The previous NCO.OP.125(b) and (c) have been deleted and reintroduced as AMC.

NCO.OP.125(b) has been inserted to introduce the concept of FRF. It also provides some risk management factors that should be used to determine a reasonable FRF, replacing the previous prescriptive values. Further guidance is included in GM1 NCO.OP.125(b).

NCO.OP.125(c) provides the same calculations of the pre-flight fuel as required by the previous NCO.OP.125(a), but with no specific numbers for FRF. It is therefore much simpler.

NCO.OP.126 has been deleted as it would be identical to NCO.OP.125, which can apply to both aeroplanes and helicopters (with respective different AMC).

NCO.OP.185 reflects the ICAO Annex 6, Part II, Chapter 2.2.4.7 standards on in-flight fuel management.

The proposed amendments to Part-NCO are designed to allow a total system approach, and are complementary to the requirements of ICAO Doc 4444 — PANS-ATM. However, Part-NCO applies to flights that are not controlled by the air traffic control (ATC), and in many circumstances, may not even be in contact with air traffic services (ATS). Therefore, the requirements relating to MINIMUM FUEL

and MAYDAY MAYDAY MAYDAY FUEL broadcasts are restricted in their mandatory application to controlled flights only (flights subject to an ATC clearance).

2.4.4. AMC/GM to Part-NCO

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

AMC2 NCO.OP.125(b) clarifies that the FRF quantity should be selected before flight, and be an easily recalled quantity (e.g. ¼ tank or 50 l). GM1 NCO.OP.125(b) further explains the concept of FRF.

AMC1 NCO.OP.125(c) covers in-flight fuel replanning. NCO.OP.125(c) has been deleted and reintroduced as AMC1 NCO.OP.125(c) as the intention is to indicate an acceptable means of satisfying the requirements through fuel replanning.

GM1 NCO.OP.185(b)&(c) suggests that the pilot-in-command considers advising the ATC of the remaining endurance when making a MINIMUM FUEL or MAYDAY MAYDAY MAYDAY FUEL broadcast, as the ATC may be more familiar with CAT operations where FRF is typically sufficient for a 30-min operation. It also provides further clarification of the meaning of a MINIMUM FUEL broadcast.

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 opinion) — Part-NCC

1. NCC.OP.105 is amended as follows:

NCC.OP.105 Specification of isolated aerodromes — aeroplanes

For the selection of alternate aerodromes and the fuel policy, the operator ~~shall~~may consider an aerodrome as an isolated aerodrome if the flying time to the nearest weather-permissible~~adequate~~ destination alternate aerodrome is more than:

(a) for aeroplanes with reciprocating engines, 60 min~~utes~~; or

(b) for aeroplanes with turbine engines, 90 min~~utes~~.

2. NCC.OP.130 is amended as follows:

NCC.OP.130 Fuel and oil supply — aeroplanes

(a) The operator shall establish a fuel planning and in-flight replanning policy to ensure that the 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 pilot-in-command shall only commence a flight if the aeroplane carries sufficient fuel and oil for the following:

(1) for visual flight rules (VFR) flights:

(i) by day, to fly to the aerodrome of intended landing and thereafter a final reserve fuel to fly for at least 30 min~~ute~~s at normal cruising altitude; or

(ii) by night, to fly to the aerodrome of intended landing and thereafter a final reserve fuel to fly for at least 45 min~~ute~~s at normal cruising altitude;

(2) for IFR flights:

(i) when no destination alternate is required, to fly to the aerodrome of intended landing, and thereafter a final reserve fuel to fly for at least ~~45~~30 min~~utes~~ at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions at maximun landing weight,~~normal cruising altitude~~ plus another 15 min to compensate for the lack of a destination alternate aerodrome; or

(ii) when a destination alternate is required, to fly to the aerodrome of intended landing, to an alternate aerodrome and thereafter a final reserve fuel ~~to fly for: at least 45 30 minutes at normal cruising altitude.~~ which shall not be less than:

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

(B) for aeroplanes with turbine engines, the fuel to fly for 30 min at holding speed at 1 500 ft (450 m) above 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.

~~(b)~~(c) In computing the fuel required including to provide for contingency, the following operating conditions shall be taken into consideration:

(1) forecast meteorological conditions;

(2) anticipated ATC routings and traffic delays;

(3) procedures for loss of pressurisation or failure of one engine while en-route, where applicable; and

(4) any other condition that may delay the landing of the aeroplane or increase fuel and/or oil consumption.

~~(c)~~(d) Nothing shall preclude amendment of a flight plan in-flight, in order to re-plan the flight to another destination, provided that all requirements can be complied with from the point where the flight is re-planned.

3. NCC.OP.151 is amended as follows:

NCC.OP.151 Destination alternate aerodromes — aeroplanes

For IFR flights, the pilot-in-command shall specify at least one weather-permissible destination alternate aerodrome in the flight plan, unless:

(a) the available current meteorological information indicates that, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period, the approach and landing may be made under visual meteorological conditions (VMC); or

(b) the place of intended landing is designated as an isolated aerodrome and:

(1) an instrument approach procedure is prescribed for the aerodrome of intended landing; and

(2) available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival:

(i) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and

(ii) visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure.

4. NCC.OP.205 is amended as follows:

NCC.OP.205 In-flight fuel management

(a) The operator shall establish a procedure to ensure that in-flight fuel checks and fuel management are performed.

(b) The pilot-in-command shall ~~check at regular intervals that~~monitor the amount of usable fuel ~~remaining in flight~~ to ensure that it is not less than the fuel required to proceed ~~a weather-permissible aerodrome or operating site and the planned reserve fuel as required by NCC.OP.130 or NCC.OP.131~~ to a site where a safe landing shall be made with the planned final reserve fuel remaining.

(c) The pilot-in-command shall advise the air traffic control (ATC) of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome or operating site, the pilot calculates that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the final reserve fuel.

(d) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest site where a safe landing can be made in accordance with normal operating procedures is less than the planned final reserve fuel.

3.2. Draft AMC and GM (draft decision) — Part-NCC

1. New AMC1 NCC.OP.130 is introduced as follows:

AMC1 NCC.OP.130 Fuel and oil supply — aeroplanes

BASIC FUEL PLANNING AND IN-FLIGHT REPLANNING POLICY

The operator should establish a basic fuel planning policy which complies with the fuel calculation criteria detailed in this AMC.

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:

(a) 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;

(b) trip fuel, which should 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 NCC.OP.130(c), and include:

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

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

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

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

(c) contingency fuel, which should be the amount of fuel required to compensate for unforeseen factors and be:

(1) 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

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

whichever is higher;

(d) destination alternate fuel, which should be:

(1) where a destination alternate aerodrome is required:

(i) 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;

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

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

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

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

(2) when the aeroplane 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;

(e) final reserve fuel;

(f) 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 the aerodrome elevation in standard conditions, make an approach and land; (additional fuel is only required if the minimum amount of fuel calculated according to (a) to (g) is not sufficient for such an event);

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

(h) discretionary fuel, if required by the pilot-in-command.

2. New GM1 NCC.OP.205(b)&(d) is introduced as follows:

GM1 NCC.OP.205(b)&(d) In-flight fuel management

PROTECTION OF FINAL RESERVE FUEL

The protection of the final reserve fuel is intended to ensure a safe landing at any aerodrome or operating site or, for helicopters, precautionary landing site, 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 should be declared and any landing option explored (e.g. for aeroplanes, 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 comprehensive in-flight fuel management policy and procedures is contained in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual.

Note: SAFE LANDING: safe landing in the context of the fuel policy is a landing at an adequate aerodrome or operating site or, for helicopters, precautionary landing site, with no less than the final reserve fuel and in compliance with the applicable operational procedures and aerodrome operating minima.

3. New GM1 NCC.OP.205(c) is introduced as follows:

GM1 NCC.OP.205(c) In-flight fuel management

DECLARATION OF MINIMUM FUEL

The declaration of MINIMUM FUEL informs the air traffic control (ATC) that all planned landing options have been reduced to a specific aerodrome or operating site of intended landing, and for helicopters, that no precautionary landing site is available, 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 aircraft 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.

3.3. Draft regulation (draft opinion) — Part-SPO

1. SPO.OP.105 is amended as follows:

SPO.OP.105 Specification of isolated aerodromes — aeroplanes

For the selection of alternate aerodromes and the fuel policy, the operator may~~shall~~ consider an aerodrome as an isolated aerodrome if the flying time to the nearest weather-permissible~~adequate~~ destination alternate aerodrome is more than:

(a) for aeroplanes with reciprocating engines, 60 min~~utes~~; or

(b) for aeroplanes with turbine engines, 90 min~~utes~~.

2. SPO.OP.130 is amended as follows:

SPO.OP.130 Fuel and oil supply — aeroplanes

(a) The operator shall establish a fuel planning and in-flight replanning policy to ensure that the 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 pilot-in-command shall only commence a flight if the aeroplane carries sufficient fuel and oil for the following:

(1) for visual flight rules (VFR) flights:

(i) by day, to fly to the aerodrome of intended landing and thereafter a final reserve fuel to fly for at least 30 min~~utes~~ at normal cruising altitude; or

(ii) by night, to fly to the aerodrome of intended landing and thereafter a final reserve fuel to fly for at least 45 min~~utes~~ at normal cruising altitude;

(2) for IFR flights:

(i) when no destination alternate is required, to fly to the aerodrome of intended landing, and thereafter a final reserve fuel to fly for at least ~~45~~30 min~~utes~~ at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions at maximun landing weight,~~normal cruising altitude~~ plus another 15 min to compensate for the lack of a destination alternate aerodrome; or

(ii) when a destination alternate is required, to fly to the aerodrome of intended landing, to an alternate aerodrome and thereafter a final reserve fuel~~to fly for: at least 45 30 minutes at normal cruising altitude.~~ which shall not be less than:

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

(B) for aeroplanes with turbine engines, the fuel to fly for 30 min at holding speed at 1 500 ft (450 m) above 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.

~~(b)~~(c) In computing the fuel required including to provide for contingency, the following operating conditions shall be taken into consideration:

(1) forecast meteorological conditions;

(2) anticipated ATC routings and traffic delays;

(3) procedures for loss of pressurisation or failure of one engine while en-route, where applicable; and

(4) any other condition that may delay the landing of the aeroplane or increase fuel and/or oil consumption.

~~(c)~~(d) Nothing shall preclude amendment of a flight plan in-flight, in order to re-plan the flight to another destination, provided that all requirements can be complied with from the point where the flight is re-planned.

3. SPO.OP.150 is amended as follows:

SPO.OP.150 Destination alternate aerodromes — aeroplanes

For IFR flights, the pilot-in-command shall specify at least one weather-permissible destination alternate aerodrome in the flight plan, unless:

(a) the available current meteorological information indicates that, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period, the approach and landing may be made under visual meteorological conditions (VMC); or

(b) the place of intended landing is designated as an isolated aerodrome and:

(1) an instrument approach procedure is prescribed for the aerodrome of intended landing; and

(2) available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival:

(i) a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and

(ii) visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure.

4. SPO.OP.190 is amended as follows:

SPO.OP.190 In-flight fuel management

(a) The operator shall establish a procedure to ensure that in-flight fuel checks and fuel management are performed.

(b) The pilot-in-command shall ~~check at regular intervals that~~monitor the amount of usable fuel ~~remaining in flight~~ to ensure that it is not less than the fuel required to proceed ~~a weather-permissible aerodrome or operating site and the planned reserve fuel as required by SPO.OP.130~~

~~or SPO.OP.131~~ to a site where a safe landing shall be made with the planned final reserve fuel remaining.

(c) The pilot-in-command shall advise the air traffic control (ATC) of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome or operating site, the pilot calculates that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the final reserve fuel.

(d) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest site where a safe landing can be made in accordance with normal operating procedures is less than the planned final reserve fuel.

3.4. Draft AMC and GM (draft decision) — Part-SPO

1. New AMC1 SPO.OP.130 is introduced as follows:

AMC1 SPO.OP.130 Fuel and oil supply — aeroplanes

BASIC FUEL PLANNING AND IN-FLIGHT REPLANNING POLICY

The operator should establish a basic fuel planning policy which complies with the fuel calculation criteria detailed in this AMC.

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:

(a) 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;

(b) trip fuel, which should 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 SPO.OP.130(c), and include:

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

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

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

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

(c) contingency fuel, which should be the amount of fuel required to compensate for unforeseen factors and be:

(1) 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

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

whichever is higher;

(d) destination alternate fuel, which should be:

(1) where a destination alternate aerodrome is required:

(i) 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;

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

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

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

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

(2) when the aeroplane 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;

(e) final reserve fuel;

(f) 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 the aerodrome elevation in standard conditions, make an approach and land; (additional fuel is only required if the minimum amount of fuel calculated in accordance with (a) to (g) is not sufficient for such an event);

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

(h) discretionary fuel, if required by the pilot-in-command.

2. <u>New GM1 NCC.OP.205(b)&(d) is introduced as follows:</u>

GM1 SPO.OP.190(b)&(d) In-flight fuel management

PROTECTION OF FINAL RESERVE FUEL

The protection of the final reserve fuel is intended to ensure a safe landing at any aerodrome or operating site or, for helicopters, precautionary landing site, 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 should be declared and any landing option explored (e.g. for aeroplanes, 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 comprehensive in-flight fuel management policy and procedures is contained in ICAO Doc 9976 — Flight Planning and Fuel Management (FPFM) Manual.

Note: SAFE LANDING: safe landing in the context of the fuel policy is a landing at an adequate aerodrome or operating site or, for helicopters, precautionary landing site, with no less than the final reserve fuel and in compliance with the applicable operational procedures and aerodrome operating minima.

3. New GM1 NCC.OP.205(c) is introduced as follows:

GM1 SPO.OP.190(c) In-flight fuel management

DECLARATION OF MINIMUM FUEL

The declaration of MINIMUM FUEL informs the air traffic control (ATC) that all planned landing options have been reduced to a specific aerodrome or operating site of intended landing, and for helicopters, that no precautionary landing site is available, 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 aircraft 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.

3.5. Draft regulation (draft opinion) — Part-NCO

1. NCO.OP.105 is amended as follows:

NCO.OP.105 Specification of isolated aerodromes — aeroplanes

For the selection of alternate aerodromes and the fuel policy, the pilot-in-command may~~shall~~ consider an aerodrome as an isolated aerodrome if the flying time to the nearest weather-permissible~~adequate~~ destination alternate aerodrome is more than:

(a) for aeroplanes with reciprocating engines, 60 min~~utes~~; or

(b) for aeroplanes with turbine engines, 90 min~~utes~~.

2. NCO.OP.125 is amended as follows:

NCO.OP.125 Fuel and oil supply — aeroplanes and helicopters

(a) The pilot-in-command shall ensure that the quantity of energy/fuel and oil carried on board is sufficient to guarantee that the intended flight is completed safely, taking into account the meteorological conditions, any element affecting the performance of the aircraft, and any delays

that are expected in flight, with an allowance for contingencies that may reasonably be expected to affect the flight.

(b) The pilot-in-command shall plan a quantity of fuel/energy to be protected as final reserve fuel/energy in order to ensure a safe landing when unforeseen occurrences may not permit safe completion of an operation as originally planned. In determining the quantity of the final reserve fuel/energy, the pilot-in-command shall take into account:

(1) the severity of the hazard to persons or property that may result from an emergency landing after fuel/energy starvation;

(2) the terrain in which such an emergency landing is made;

(3) the weather conditions at and close to the destination/alternate aerodrome;

(4) the precision of the measurement and calculation of fuel/energy expected on board at the end of the flight;

(5) the availability of alternative landing options; and

(6) the likelihood of unexpected circumstances that might prevent or delay a safe landing at the end of the intended flight;

(~~a~~c) The pilot-in-command shall only commence a flight if the aircraft carries sufficient energy/fuel and oil for the following:

~~(1) for visual flight rules (VFR) flights:~~

~~(i) by day, taking-off and landing at the same aerodrome/landing site and always remaining in sight of that aerodrome/landing site, to fly the intended route and thereafter for at least 10 minutes at normal cruising altitude;~~

~~(ii) by day, to fly to the aerodrome of intended landing and thereafter to fly for at least 30 minutes at normal cruising altitude; or~~

~~(iii) by night, to fly to the aerodrome of intended landing and thereafter to fly for at least 45 minutes at normal cruising altitude;~~

~~(2) for IFR flights:~~

~~(i) when no destination alternate is required, to fly to the aerodrome of intended landing and thereafter to fly for at least 45 minutes at normal cruising altitude; or~~

~~(ii) when a destination alternate is required, to fly to the aerodrome of intended landing, to an alternate aerodrome and thereafter to fly for at least 45 minutes at normal cruising altitude.~~

(1) for visual flight rules (VFR) flights and instrument flight rules (IFR) flights, when no destination alternate is required, sufficient energy/fuel and oil to fly to the aerodrome or operating site of intended landing plus the final reserve fuel/energy; and

(2) for IFR flights, when a destination alternate is required, sufficient energy/fuel and oil to fly to the aerodrome or operating site of intended landing, and thereafter to an alternate aerodrome, plus the final reserve fuel/energy.

~~(b) In computing the fuel required including to provide for contingency, the following shall be taken into consideration:~~

~~(1) forecast meteorological conditions;~~

~~(2) anticipated ATC routings and traffic delays;~~

~~(3) procedures for loss of pressurisation or failure of one engine while en-route, where applicable; and~~

~~(4) any other condition that may delay the landing of the aeroplane or increase fuel and/or oil consumption.~~

~~(c) Nothig shall preclude amendment of a flight plan in-flight, in order to re-plan the flight to another destination, provided that all requirements can be complied with from the point where the flight is re-planned.~~

3. NCO.OP.126 is deleted as follows:

~~NCO.OP.126 Fuel and oil supply — helicopters~~

~~(a) The pilot-in-command shall only commence a flight if the helicopter carries sufficient fuel and oil for the following:~~

~~(1) for VFR flights, to fly to the aerodrome/operating site of intended landing and thereafter to fly for at least 20 minutes at best range speed; and~~

~~(2) for IFR flights:~~

~~(i) when no alternate is required or no weather-permissible alternate aerodrome is available, to fly to the aerodrome/operating site of intended landing, and thereafter to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the destination aerodrome/operating site under standard temperature conditions and approach and land; or~~

~~(ii) when an alternate is required, to fly to and execute an approach and a missed approach at the aerodrome/operating site of intended landing, and thereafter:~~

~~(A) to fly to the specified alternate; and~~

~~(B) to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate aerodrome/operating site under standard temperature conditions and approach and land.~~

~~(b) In computing the fuel required including to provide for contingency, the following shall be taken into consideration:~~

~~(1) forecast meteorological conditions;~~

~~(2) anticipated ATC routings and traffic delays;~~

~~(3) procedures for loss of pressurisation or failure of one engine while en-route, where applicable; and~~

~~(4) any other condition that may delay the landing of the aircraft or increase fuel and/or oil consumption.~~

~~(c) Nothing shall preclude amendment of a flight plan in flight, in order to re-plan the flight to another destination, provided that all requirements can be complied with from the point where the flight is re-planned.~~

4. NCO.OP.185 is amended as follows:

NCO.OP.185 In-flight fuel management

(a) The pilot-in-command shall ~~check at regular intervals that~~monitor the amount of usable fuel/energy or, for balloons, ballast remaining ~~in flight~~to ensure that it is not less than the fuel/energy ~~or ballast~~ required to proceed to a ~~weather-permissible aerodrome or operating site and the planned reserve fuel as required by NCO.OP.125, NCO.OP.126 or NCO.OP.127~~site where a safe landing can be made with the planned final reserve fuel/energy remaining.

(b) The pilot-in-command of a controlled flight shall advise the air traffic control (ATC) of a minimum fuel/energy state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome or operating site, the pilot calculates that any change to the existing clearance to land at that aerodrome or operating site, or other air traffic delays, may result in landing with less than the final reserve fuel/energy.

(c) The pilot-in-command of a controlled flight shall declare a situation of fuel/energy emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL when the usable fuel/energy estimated to be available upon landing at the nearest site where a safe landing can be made in accordance with normal operating procedures is less than the planned final reserve fuel/energy.

3.6. Draft AMC and GM (draft decision) — Part-NCO

1. New AMC1 NCO.OP.125(b) is introduced as follows:

AMC1 NCO.OP.125(b) Fuel and oil supply — aeroplanes and helicopters

The final reserve quantity should be no less than required to fly:

(a) for aeroplanes:

(1) for 10 min at normal cruising altitude for visual flight rules (VFR) flights by day, taking-off and landing at the same aerodrome/landing site and always remaining in sight of that aerodrome/landing site;

(2) for 30 min at normal cruising altitude for other VFR flights by day; and

(3) for 45 min at normal cruising altitude for VFR flights by night, and instrument flight rules (IFR) flights; and

(b) for helicopters:

(1) for 20 min at best-range speed for VFR flights; and

(2) for 45 min at holding speed at 1 500 ft (450 m) above the destination for instrument flight rules (IFR) flights.

2. New AMC2 NCO.OP.125(b) is introduced as follows:

AMC2 NCO.OP.125(b) Fuel and oil supply — aeroplanes and helicopters

The quantity of final reserve fuel/energy should be planned before flight and be an easily recalled figure against which the pilot-in-command is able to assess the current fuel/energy state of the aircraft.

3. New GM1 NCO.OP.125(b) is introduced as follows:

GM1 NCO.OP.125(b) Fuel and oil supply — aeroplanes and helicopters

The planned final reserve fuel/energy (FRF) is intended to be protected as a reserve in normal operations, i.e. the pilot-in-command should consider it to be an emergency if the fuel/energy on board falls below the final reserve fuel/energy. The FRF is not intended to be used as a contingency in normal operations. When the final reserve fuel can no longer be protected, then a fuel emergency should be declared and any landing option explored, including deviating from rules, operational procedures and methods in the interest of safety.

4. New AMC1 NCO.OP.125(c) is introduced as follows:

AMC1 NCO.OP.125(c) Fuel and oil supply — aeroplanes and helicopters

IN-FLIGHT REPLANNING

A flight plan may be amended during flight in order to replan the flight to another destination provided that all requirements are complied with from the point where the flight is replanned.

5. New GM1 NCO.OP.125(b)(6) is introduced as follows:

GM1 NCO.OP.125(b)(6) Fuel and oil supply — aeroplanes and helicopters

The likelihood of unexpected cinsumstances arising after the aircraft is fuelled may increase with the duration of the planned flight (e.g. during a long flight, a problem at the destination aerodrome or operating site is more likely to have occurred than during a short local flight).

6. New GM1 NCO.OP.185(b)&(C) is introduced as follows:

GM1 NCO.OP.185(b)&(c) In-flight fuel management

(a) The pilot-in-command may consider reporting the remaining fuel/energy endurance after a MINIMUM FUEL or MAYDAY MAYDAY MAYDAY FUEL broadcast.

Note: as for CAT, the final reserve fuel is always 30 min, but for NCO operators, the final reserve varies from 10 to 45 min; therefore, the air traffic control (ATC) may not be aware of the amount of the remaining fuel/energy.

(b) The declaration of MINIMUM FUEL informs the air traffic control (ATC) that all planned landing options have been reduced to a specific aerodrome or operating site of intended landing, that no precautionary landing site is available, 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 aircraft to ensure that other ATC units are aware of the flight's fuel state.

(c) A precautionary landing site refers to a landing site other than the site of intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel.

4. RIA for Part-NCC and Part-SPO

4.1. Issues to be addressed

4.1.1. Overview

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

For consistency reasons, and although ICAO Annex 6, Part II is not applicable to aerial work (Part-SPO), all changes and reasoning in Part NCC have also been applied to Part-SPO in order to maintain the alignment between the two Parts.

4.1.2. Consistency across operations

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

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

4.1.3. Tailored for complex motor-powered aircraft

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

4.1.4. Alignment with ICAO Annex 6, Part II at Amendment 33

ICAO Annex 6, Part II, Chapter 2 is applicable to all GA aircraft. However, Chapter 3 contains different and additional rules for large and turbojet aircraft. The fuel planning rules of Chapter 3 are much more similar to the requirements of Part-CAT than to those of Part-NCC. Alignment between Part-NCC and ICAO SARPs is, therefore, desirable.

4.1.5. Safety risk assessment

No specific safety analysis was carried out for the proposed amendments to Part-NCC.

4.1.6. Who is affected?

The changes proposed mostly affect air operators and crew of non-commercial complex motor-powered aircraft, as well as NAAs overseeing regulatory compliance.

4.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This sub-NPA contributes to the achievement of the overall objectives by implementing a performance-based approach to NCC operations, thus ensuring safe flight operations with efficient and environmentally friendly fuel planning procedures.

4.3. Policy options

Option 0: no change in rules. The FRF for 45 min in instrument flight rules (IFR) operations at night and 30 min in visual flight rules (VFR) operations remain. No update in line with ICAO Annex 6, Part II at Amendment 33 radio telecommunication terminology.

Option 1: amendments to Part-NCC as proposed in this sub-NPA. The FRF remains unchanged in terms of quantity, but the concept is to clarify the rule by introducing the wording final reserve fuel. In addition, new radio telecommunication terms have been introduced (e.g. MINIMUM FUEL broadcast) in accordance with ICAO Annex 6 ,Part II at Amendment 33. Detailed criteria have been introduced in the fuel policy, equivalent to the 'basic fuel scheme' option proposed for Part-CAT for consistency reasons.

Option 2: transposition of ICAO Annex 6, Part II, Chapter 3.4.3.5 on fuel requirements and Chapter 3.4.3.6 on in-flight fuel management into Part-NCC and transposition of the Part-CAT basic fuel scheme and ICAO Annex 6, Part II, Chapter 3.4.3.6 on in-flight fuel management into Part-NCC.

Table 1 — Selected policy options

Option No	Short title	Description
0	Do nothing — current Part-NCC and Part-SPO rules	Baseline option: no change in rules; risks remain as outlined in the issue analysis.
1	Amend Part-NCO rules	FRF at pilot discretion with regard to situational criteria; safety-objective-based approach.
2	Align with ICAO Annex 6 and Part-CAT	Transposition of ICAO Annex 6, Part II, Chapter 3.4.3.5 on fuel requiements and Chapter 3.4.3.6 on in-flight fuel management, as well as transposition of the Part-CAT basic fuel scheme.

4.4. Analysis of impacts

4.4.1. Safety impact

Option 2 is likely to improve safety through harmonisation with the Part-CAT fuel scheme. Reducing the FRF from 45 to 30 min increases risk in principle, but also leads to a level of risk associated with fuel planning and management commensurate with that of Part-CAT. This should be acceptable for Part-NCC, and is not considered as a negative safety impact in this analysis.

4.4.2. Environmental impact

Option 2 has a small positive environmental impact when reducing the FRF from 45 to 30 min,however, this reduction is non-significant.

4.4.3. Social impact

N/a.

4.4.4. Economic impact

Turbine-powered aircraft are used in almost all flights conducted under Part-NCC. Approximately 4 % of the extra fuel carried is burned per hour of flight. Hence, on a flight of x-minute duration, a reduction of the FRF from 45 to 30 min leads to a saving of 4 %/hr multiplied by 15 min of fuel. This is (whatever the value of x) 1 % of the fuel cost of the flight.

Thus, Option 2 saves approximately 1 % of the fuel cost of flights operated under Part-NCC. Option 1 has the potential to save more, but it seems likely that the pilot-in-command of a complex-motor-powered aircraft would rarely make use of this option and carry a lower FRF quantity. Therefore, the economic impact, although positive, is very limited.

4.4.5. Impact on 'better regulation' and harmonisation

The differences between Part-NCC and ICAO Annex 6, Part II, Chapter 3 can be evaluated for each option.

	NCC.OP.130 vs *ICAO Annex 6, Part II,* ***Chapter 3.4.3.5***	***NCC.OP.205 vs*** *ICAO Annex 6, Part II,* ***Chapter 3.4.3.6***
Option 0	Significant negative differences in algorithm and quantities	Chapter 3.4.2.3.6.3/4 missing from Part-NCC
Option 1	Significant negative differences in algorithm and quantities	No significant differences
Option 2	A minor difference in Chapter 3.4.3.5.3(d)(3) on isolated aerodromes has been omitted	No significant differences

4.5. Comparison and conclusion

4.5.1. Comparison of options

Options	*Option 0*	*Option 1*	*Option 2*
Safety	0	–	0
Environmental	0	+	+
Economic	0	0	+
GA and proportionality	0	0	0
'Better regulation' and harmonisation	– –	–	+++
Total	–	–/+	+/+++

Note: social impacts are not relevant for this RIA.

Therefore, Option 2 is the preferred one.

5. RIA for Part NCO

5.1. Issues to be addressed

5.1.1. Overview

Part NCO fuel planning rules have the potential to impose more restrictive requirements to the GA community than equivalent national rules.

This fuel planning issue for GA will be more visible as of August 2016 when most MSs will implement the current Part-NCO if no amendement to the rule is adopted by then. Unlike some of the certification and maintenance issues raised in that context within the GA Road Map, this issue tends to affect a relatively small minority of operations. This assessment shows the extent to which these implementation issues could create problems, and indicates how much more efficient the GA system could be if a performance-based approach were applied to GA fuel planning requirements.

5.1.2. National regulations on fuel planning

National regulations on fuel planning vary among different MSs between cases with a simple performance-based safety objective (e.g. in the UK, *(…) sufficient fuel, oil and engine coolant, if required, are carried for the intended flight, and that a safe margin has been allowed for contingencies (…)*[7]) and those based on the prescriptive historic 30/45-min provisions of ICAO Annex 6, Part II.

Table 2 shows an analysis of the current national regulations in a number of EASA MSs. They are categorised as being either 'Safety-objective-based' or 'Prescriptive' (i.e. specifying a minimum number of minutes of reserve fuel).

While most flights are likely to be compliant with the Part-NCO requirements, excessive requirements for fuel carriage represent a cost burden. In addition, for air operators that are used to a national safety-objective-based system, explicit numerical requirements for reserve fuel represent a restriction on operational flexibility; consequently, some air operations otherwise flown with an acceptable level of safety may be prohibited under Part-NCO.

5.1.3. Introduction of the concept of 'final reserve fuel (FRF)'

In the current Air OPS Regulation, NCO.OP.185 introduces the concept of 'FRF' as the fuel (10/30/45-min) required beyond the trip fuel and alternate fuel of NCO.OP.126/NCO.OP.127. The latter requirements merely specify that this fuel must be loaded before flight commencement, do not describe it as a 'reserve', and do require that the fuel is still present on landing.

In the absence of NCO.OP.185, the 10/30/45-min of fuel might be used as an in-flight contingency (which is allowed under most national regulations with prescriptive fuel planning rules). With NCO.OP.185, if trip fuel plus 10/30/45-min of fuel is loaded, and the fuel burn exceeds the planned fuel burn by just a litre, a diversion is mandated as landing would not be possible with only FRF since the difference is significant. In order to be confident that the flight can be completed as planned, the pilot must load contingency fuel in addition to the FRF.

[7] See The Air Navigation Order 2009, Part 10, 86(3)(e)(i).

One possibility of alleviation of the rules might have been to combine the concepts of FRF and contingency fuel. However, the air traffic management (ATM) phraseology (introduced in the previous amendments to NCO.OP.185) is based on the FRF; thus, if this approach had been applied, the consistency across all operation types, as normally expected by ATM, would not have been achieved.

5.1.4. Consistency with the GA Safety Strategy and GA Road Map principles

The European GA Safety Strategy and GA Road Map embrace the principle of risk differentiation, that the level of regulatory protection afforded to stakeholders should depend on their ability to assess and control risk. At one end of the risk hierarchy are uninvolved third-party stakeholders, who should be protected from relatively low risks, while at the other end are pilots conducting private flights, who should be permitted to accept a significant level of risk if they choose to do so.

It accepts that the achievable level of safety for GA is likely to be orders of magnitude lower than that of CAT, and that disproportionate regulation distorts risk management by forcing the expenditure of limited resource (whether time, money or focus) on the wrong risks.

Accordingly, a fundamental principle of the GA Safety Strategy is "P1. One size does not fit all. GA should be handled quite separately from CAT and merits a different, proportionate approach based on an acceptable risk hierarchy."

However, Part-NCO sets out, in its implementing rules, a fuel planning regime almost entirely equivalent to the Part-CAT regime. In fact, as a consequence of the relationship between hard and soft law in Part-NCO (which in itself is reasonable), Part-NCO elevates the fuel planning policies of Part-CAT from AMC to implementing rules.

Furthermore most CAT is conducted by turbine aircraft with a 30 min FRF, while Part-NCO requires a 45 min reserve for IFR. Thus the NCO regime (trip fuel + alternate fuel + contingency fuel + 45 min FRF) is in fact more conservative than the CAT regime.

The 2013 Annual Safety Review indicates just one CAT and one business aviation accident involving fuel from 2004 to 2013 involving EASA member state operators, neither of them fatal. It appears that the CAT regime for fuel planning offers a level of risk of fuel exhaustion fatal accident that is compatible with the 10^{-8} per flight hour hull loss rate of typical CAT, and is probably closer to 10^{-10} per flight hour.

Such a low target level of risk of fuel exhaustion may be justified for CAT, but it is, however, disproportionate for GA. If one can reduce the risk of fuel exhaustion to 10^{-10} per flight hour by following these fuel planning procedures (trip fuel + alternate fuel + contingency fuel + 30 min FRF), then a more permissive fuel planning policy (e.g. a lower FRF or combined reserve and contingency) should be capable of achieving a more realistic risk of fuel exhaustion of 10^{-8} or 10^{-7} per flight hour, which is commensurate with other major GA risks.

5.1.5. Performance-based rules vs compliance-based rules

Since the Agency is moving from prescriptive regulation towards performance-based regulation, the proposed NCO.OP.125(a) appears to be perfectly adequate as a safety objective. Using appropriate guidance provided by this NCO.OP.125(a), the pilot is allowed to manage the risk of fuel exhaustion alongside the other aviation risks that are not addressed by regulation (for further details, see the safety risk assessment below).

5.1.6. Technology enablers

Since the values of 30 and 45 minutes for planned fuel at destination were originally set, GA fuel totalisation technologies have significantly advanced. In the 1970s, pilots might have a view on fuel consumption rate to +/- 20% or so, based on POH numbers and past experience. In 2015, many GA aircraft have fuel computers that even interface with GNSS navigators, allowing a much more precise (though never, of course, perfect) estimate of the fuel remaining and the fuel required to destination. While this clearly does not replace the need for contingency planning, it does significantly reduce the margin required by eliminating some of the major uncertainties.

Operators who have invested in such systems to manage fuel risk should be permitted to take advantage of their benefits.

5.1.7. Alignment with ICAO Annex 6, Part II at Amendment 33

Since Part-NCO came into effect in 2013, ICAO has issued State Letter 14/10 with Annex 6 Part II at Amendment 33.

The significant amendments to the previous text are in 2.2.3.6, for example in 2.2.3.6.1(c), where:

when the flight is conducted in accordance with the visual flight rules by day, flight to the aerodrome of intended landing, and after that for at least 30 minutes at normal cruising altitude

has been amended to:

when the flight is conducted in accordance with the visual flight rules by day, flight to the aerodrome of intended landing, and after that, ***have a final reserve fuel*** *for at least 30 minutes at normal cruising altitude*

with analogous changes in the other Parts (a,b,d) of 2.2.3.6.1.

A new paragraph has then been added:

2.2.3.6.2 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.

Three new paragraphs on in-flight fuel management have also been added:

2.2.4.7.1 The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it 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.

2.2.4.7.2 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, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note.— The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance, or air traffic delays, 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.

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

Note 1.— The planned final reserve fuel refers to the value calculated in 2.2.3.6 and is the minimum amount of fuel required upon landing at any aerodrome.

Note 2.— The words "MAYDAY FUEL" describe the nature of the distress conditions as required in Annex 10, Volume II, 5.3.2.1.1, b) 3.

There is a significant advantage in having the same fuel planning and management concepts (such as the FRF) for all airspace users. This enhances safety by enabling standard phraseology and harmonised interpretation thereof.

Part-NCO already reflects partly ICAO Annex 6, Part II, Chapters 2.2.3.6.2 and 2.2.4.7.3. The proposed new requirements align in most respects with the ICAO SARPs, with the exception of the omission of the prescriptive requirements for the FRF. One issue raised in this regard was how to communicate differing-time values of FRF to the ATC, who might expect a standard value of 30 min. Guidance material has been added to address this.

In evaluating ICAO SARPs, the Agency must balance the needs of the air operators operating on a global scale against the needs of those operating within the combined borders of one or more MSs. In the case of NCO, there is no justification to adopt SARPs that conflict with the GA Safety Strategy and GA Road Map regarding a performance-based approach.

5.1.8. Safety risk assessment

The GA Road Map identified one of the five major risks for GA as '**Forced landings due to pilot error**'. (Most often caused by running out of fuel)'(EASA MB 04/2012, WP9a — General Aviation Roadmap). Therefore, to support this sub-NPA, the Agency has analysed fuel-related accidents in the EU.

The data in this analysis has been collected by the Agency in its ECCAIRS[8] ADREP[9] and IORS[10] databases, which contain information on accidents and serious incidents, as well as incidents within the scope of the Agency. This covers all GA fixed-wing accidents that have occurred in the EASA MSs, regardless of the aircraft type concerned, as well as accidents involving European products worldwide. Data used for rate calculations are fleet size figures based on data collected by the Agency in 2012. This data set is rather incomplete. Where data is missing, an assumption is made to fill the gap. The data set of European GA fixed-wing fuel starvation accidents which occurred within the period 2006–2014 (a total of 143 accidents) was manually recoded using a new taxonomy in order to gain a better understanding of the topics.

The general trends are as follows:

[8] European Co-Ordination Centre for Accident and Incident Reporting Systems.

[9] Accident/Incident Data Reporting.

[10] Internal Occurrence Reporting System of the Agency.

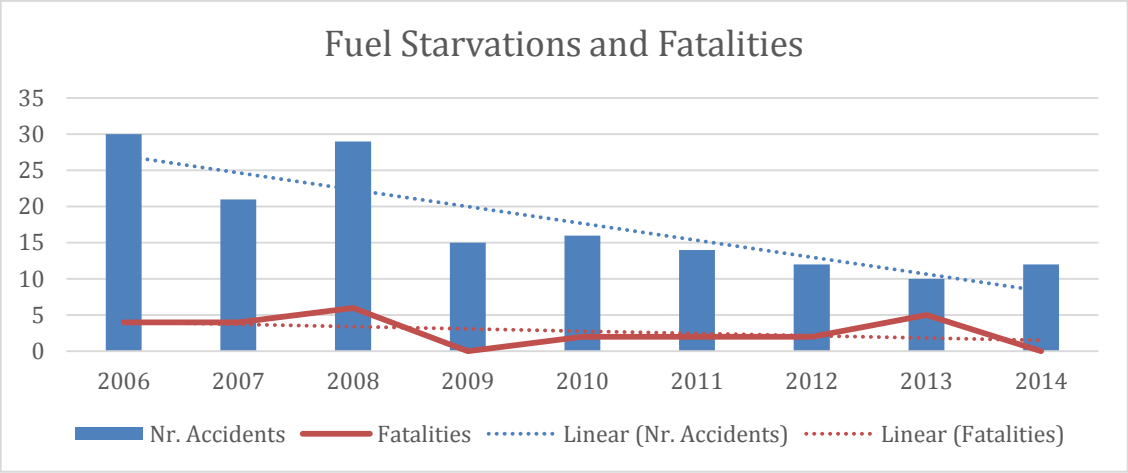

Figure 1 — Fuel starvation accidents and fatalities per year (2006–2014)

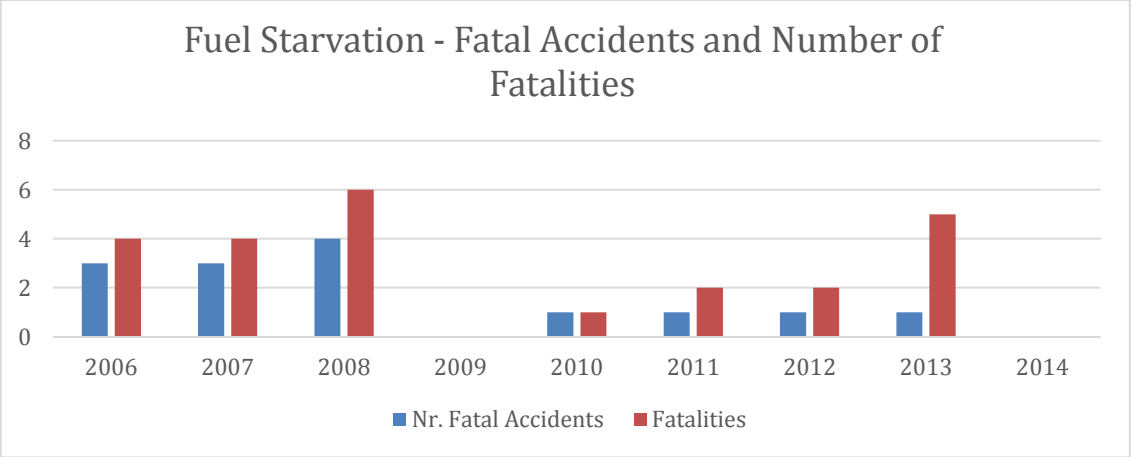

Figure 2 — Fatal accidents and fatalities (2006–2014)

Of the 14 fatal accidents in the 9-year period due to engine failure after fuel starvation, only 5 appear to be relevant to fuel planning, i.e. the amount of fuel loaded before departure. While these accident numbers are significant enough to attract attention, they form only a small part of the overall risk portfolio of GA.

One objective of this analysis was to compare the safety impacts of performance-based and safety-objective-based rules vs prescriptive rules. Prior to the introduction of Part-NCO, some MSs used fuel reserve rules prescribing specific fuel reserve quantities in minutes (e.g. Sweden, France, Denmark and Poland) while others had a simple rule that the amount of fuel loaded must be sufficient for the flight and contingencies (e.g. United Kingdom and Germany). A significant difference in fuel starvation accident rates between the above-mentioned two groups of MBs might point to a difference in efficacy between the two types of rules. Fleet sizes are used to estimate the relative exposure rates.

Table 2 — Fuel starvation accidents in terms of rule types and fleet size per MS of occurrence

Rule type	**MS of occurrence**	**Accidents**	**Fleet size**
Safety-objective based	UK, DE	45	15403
Prescriptive	FR, DK, SE, PL	52	8338

Using a standard Poisson distribution Cochran's C test on the number of accidents, with the fleet size as the measure of exposure, there is a **significant difference** (probability P-value = 0.000253, 95 % confidence interval on a ratio of 0.31–0.72) in the fuel starvation accident rates between these groups of MSs. Those applying safety-objective-based rules have a lower accident rate than those having prescriptive rules.

When considering this conclusion, however, the following should aslo be taken into account:

— including different MSs, once their sets of rules are known, may change the conclusion;

— there may be systematic differences between MSs e.g. on reporting rates;

— the prescriptive sets of rules are not common among all MSs (e.g. in France, the prescriptive rule requires 20 min for VFR, and not 30 min);

— the fleet sizes are estimates and do not necessarily correlate completely with exposure to risk; and

— geographical factors may lead to different susceptibilities to fuel exhaustion (e.g. big countries with few airports vs small countries with many airports).

On the contrary, it may be appropriate to consider the MS of registry instead of the MS in which the accident occurred, as the air operator may be using the rules of the MS of registry.

Table 3 — Fuel starvation accidents in terms of rule types and fleet size per MS of registry.

Rule type	**MS of registry**	**Accidents**	**Fleet size**
Safety-objective-based	UK, DE	51	15403
Prescriptive	FR, DK, SE, PL, USA	57	11871

Using a standard Poisson distribution Cochran's C-Test on the number of accidents, with the fleet size as the measure of exposure, there is **no significant difference** (probability P-value = 0.0647, 95 % confidence interval on a ratio of 0.46–1.02) in the fuel starvation accident rates between these groups of MSs. Note, however, that the result may strongly depend on the estimate of the fleet size of US-registered aircraft.

The final analysis was performed restricting the accidents to those for which the database indicates 'Fuel Planning' as a potential causal event.

Table 4 — Fuel starvation accidents when fuel planning is a causal event in terms of rule types and fleet size per MS of registry.

Rule type	**MS of registry**	**Accidents**	**Fleet size**
Safety objective	UK, DE	14	15403
Prescriptive	FR, DK, SE, PL, USA	25	11871

Using a standard Poisson distribution Cochran's C-Test on the number of accidents, with the fleet size as the measure of exposure, there is a **significant difference** (probability P-value = 0.00772, 95 % confidence interval on a ratio of 0.21–0.86) in the fuel starvation accident rates between these groups of MSs.

It can be inferred from these analyses that prescriptive rules offer no significant safety performance advantage over a safety-objective-based rule.

5.1.9. Who is affected?

The changes proposed mostly affect GA pilots and NAAs overseeing regulatory compliance. For the purposes of this analysis, GA air operators are not distinguished from GA pilots as they are usually the same person.

5.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This sub-NPA contributes to the achievement of the overall objectives by implementing the GA Road Map Safety Strategy and a performance-based approach to GA NCO operations, thus ensuring safe flight operations with efficient and environmentally friendly fuel planning procedures.

5.3. Policy options

Option 0: Part-NCO remains unchanged; 45 min FRF for IFR at night, 30 min for VFR, and 10 min for local VFR in sight of the aerodrome.

Option 1: Part-NCO remains unchanged: 45 min FRF for IFR at night, 30 min for VFR, and 10 min for local VFR in sight of the aerodrome, but NCO.OP.185(b) and (c) is also added to introduce the MINIMUM FUEL and MAYDAY FUEL phraseology.

Option 2: proposal to amend Part-NCO: FRF at pilot discretion taking into account criteria set out in the proposed amendments with no specific numbers for FRF.

Where Options 0 and 1 have an equivalent impact, they are referred to as 'Option 0/1'.

Table 4 — Selected policy options

Option No	Short title	Description
0	Do nothing — current Part-NCO rules on fuel planning procedures	Baseline option: no change in rules; risks remain as outlined in the issue analysis — prescriptive approach.
1	Align NCO.OP.185 with ICAO	Retain current rules but add the proposed NCO.OP.185(b) and (c) on in-flight fuel management — prescriptive approach
2	Amend Part-NCO with safety-objective-based fuel planning rules	FRF at pilot discretion applying situational criteria — safety-objective-based approach

5.4. Analysis of impacts

The two overall potential benefits of selecting Option 2 over Option 0/1 would be:

— some flights between A and B that would otherwise require a fuel stop at the intermediate Airport C would be able to fly without a stop; and

— in some circumstances, the amount of fuel loaded (and not used) on a flight between A and B could be reduced.

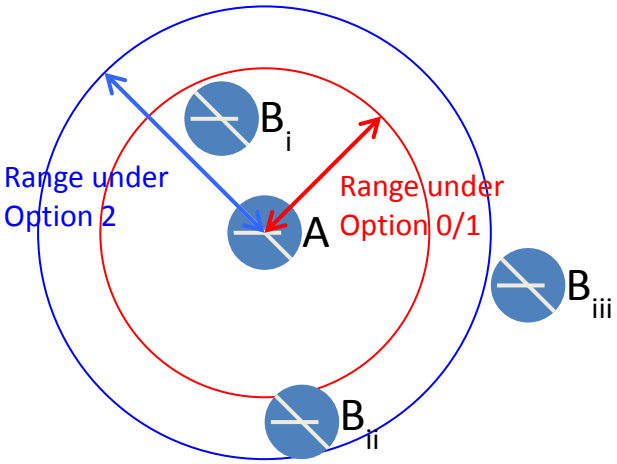

Figure 3 — Illustration of the range improvement

The above figure illustrates the avoidance of a fuel stop by increased range, as well as the first of these benefits:

— flights between A and B_i never need an intermediate stop;

— flights between A and B_{ii} need an intermediate stop under Option 0/1 but not under Option 2; and

— flights between A and B_{iii} always need an intermediate stop.

The proposal of Option 2 is to change from a compliance-based rule to a safety-objective-based rule with related AMC/GM, where the AMC/GM essentially replicate the quantitative aspects of the compliance-based rule, but also leave at the pilot-in-command's discretion to deviate from these rules when circumstances permit. The impact of the change on cost, therefore, depends strongly:

— on the proportion of the time that the pilot makes use of this discretion and in this case,on how often the pilot would choose to take less fuel than the amount specified by the compliance-based rule; and

— on the extent to which the pilot makes use of this discretion and in this case, on how much less fuel the pilot would choose to take.

Each of these factors is considered to be a statistical distribution. At the extreme, there may be strongly risk-averse pilots who would never choose to take less fuel than the compliance-based rule requires. There may also be aircraft where the poor sensing precision and inconsistency between fuel quantity and consumption make use of this discretion impractical.

Conversely, there may also be pilots who are comfortable with making use of the discretion offered (or even are obliged to make use of it for normal operations because their aircraft are not designed for use with significant contingency and reserve fuel), as well as aircraft with fuel flow sensing which permits confidence of precision of remaining fuel indication to the minute.

The extent of the reduction of FRF also covers a broad range. In some cases, a 30-min FRF on a VFR flight might be reduced to 25 min (a 5-min saving). In others, a 45-min FRF for an IFR flight in good VMC might be reduced to 10 min (a 35-min saving). For local flights remaining within sight of the aerodrome, it is unlikely that a 10-min FRF would be reduced at all.

In this assessment, therefore, the average case of a 30-min FRF being reduced to 10-min FRF on a suitable VFR flight is used. It would also apply without significant alteration to a 45-min FRF for an IFR or VFR flight at night being reduced to 25 min.

5.4.1. Safety impact

The safety analysis of Section 5.1.8 above shows that safety-objective-based fuel planning rules (Option 2) in national legislation perform at least as well as prescriptive rules (Option 0) in respect of prevention of fuel planning and fuel starvation accidents.

5.4.2. Environmental impact

Option 2 could have a small positive environmental impact in terms of reducing the number of take-offs and landings required for fuel stops. This, however, is considered non-significant.

5.4.3. Social impact

Option 2 would allow to perform longer flights than the ones allowed by Option 0/1. Nevertheless, this would affect only a very small proportion of GA flights. Therefore, this social criterion has not been further considered in this analysis.

5.4.4. Economic impact

(a) FLIGHTS POSSIBLE UNDER OPTION 2, NOT UNDER OPTION 0/1

Consider the scenario of a typical GA aircraft with 100 kt speed, 700 lb payload, and 60 lb/hr burning including contingency:

— with 30-min FRF (30-lb), and 3 x 170 lb occupants, the range is 160 lb x 100 nm/hr/60 lb/hr = 267 nm; and

— with 10-min FRF (10-lb), and 3 x 170 lb occupants, the range is 180 lb x 100 nm/hr/60 lb/hr = 300 nm.

Considering a mission with three occupants (see Figure 3 above):

— for airports B_i in the range of 0–267 nm (still air), the flight is always possible non-stop;

— for airports B_{ii} in the range of 267–300 nm, the flight requires a stop with 30-min FRF, but not with 10-min FRF; and

— for airports B_{iii} beyond the range of 300 nm, the flight always requires a stop.

In addition, it is assumed that:

— approximately 5 % of intended flights are to airports such as B_{ii} and avoid a stop by using 10-minute and not 30-min FRF;

— a reduction of 30-min to 10-min FRF is possible under the given criteria approximately 60 % of the flight time; for the remaining 40 % of the flight time, weather or other factors preclude the reduction to a 10-min FRF; and

— the cost of stop (see Figure 4 below) is as follows:

- 15 min of extra flying, therefore at EUR 200/hr, the amount is EUR 50; plus
- EUR 30 for the landing fee; plus
- 3 persons x 40 min each at 10 EUR/hr, the amount is EUR 20.

Thus, the sum up of the three amounts above will be EUR 100.

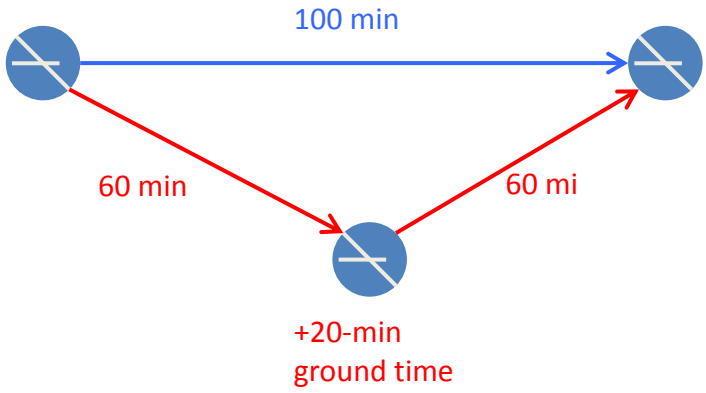

Figure 4 — Illustration of the time cost of a typical fuel stop

Average avoided cost per flight is: 5% x 60% x EUR 100 = EUR 3 for Option 2 vs Option 0/1.

Typical cost of flight is EUR 600. Consequently, net cost of Option 0/1 vs Option 2 per flight is 0.5 % of GA flying time spent.

Note that this assessment assumes that a suitable fuel stop is available, that it is close to the route to the intended destination and that the weather is also appropriate. Under certain circumstances, the difference between Option 0/1 and Option 2 is the ability to perform the flight or not. The cost of a missed stop might be assessed as higher than the cost of EUR 100 of an actual stop.

Assuming 5 million flight hours per year multiplied by EUR 200 per flight hour, the total flight cost accrued is EUR 1 billion.

The saving for GA, if Option 2 is selected against Option 0/1, is therefore about 0.5 % or EUR 5 million per year.

(b) EXTRA FUEL CARRIED UNDER OPTION 0/1 VS OPTION 2

Burn-off rates (the fraction of extra fuel loaded that is used to carry the weight of the extra fuel itself) in GA aeroplanes tend to be lower than in transport category aircraft. On the assumption that drag is proportional to weight (valid at best lift/drag (L/D) airspeed), the typical burn-off is the hourly fuel consumption divided by the aircraft total weight.

For a typical GA aircraft, this is likely to be about 2.5–3 %/hr. GA aircraft tend to cruise faster than the best L/D airspeed, so a burn-off rate of 2 %/hr might be a reasonable estimate.

In principle, if the same assumption is used, then reduction of a 30-min FRF to a 10-min FRF is possible under the given criteria approximately 60 % of the time.

Consequently, the net saving of Option 2 vs Option 0/1 is 20-min fuel multiplied by 60 % multiplied by 2 % per 60-min flight, or 0.24-min fuel per 60-min flight (0.4 %). The saving is more on longer flights, and less on shorter ones.

Assume also that 25 % of these flights are local and would be permitted to use a 10-min FRF under Option 0/1 or Option 2; 75 % leave sight of the aerodrome and would be permitted to use a 10-min FRF only under Option 2, not under Option 0/1.

Assuming 5 million flight hours per year multiplied by 40 l/hr multiplied by EUR 2.50/l, the total fuel spent is EUR 500 million. The saving to GA, if Option 2 is selected against Option 0/1 is therefore about 75 % x 0.4 % = 0.3 % of the total fuel spent, or EUR 1.5 million per year.

The economic impact of Option 1 is equivalent to that of Option 0.

5.4.5. GA and proportionality issues

Option 0: netural impact.

Option 1 would impose an obligation to declare an emergency in circumstances where the pilot might not consider the fuel situation critical enough for such a decision, but simply because the aircraft would land with less than the minimum FRF permitted by the prescriptive rule. This may cause unnecessary disruption to the ATM system, and might also be considered having a negative safety impact itself, but it is also assessed under the aspect of proportionality.

Option 2 is considered to meet the objective of the GA Road Map to allow air operators, able to assess and control the risk to which they are exposed, to do so without regulatory intervention.

5.4.6. Impact on 'better regulation' and harmonisation

The differences between Part-NCO and ICAO Annex 6, Part II can be evaluated for each option.

Table 5 — Overview of the impacts on 'better regulation' and harmonisation

	NCO.OP.125 vs *ICAO Annex 6, Part II,* ***Chapter 2.2.3.6***	***NCO.OP.185 vs*** *ICAO Annex 6, Part II,* ***Chapter 2.2.4.7***
Option 0	10-min fuel reserve permitted for local VFR — FRF not defined	ICAO Annex 6, Part II, Chapter 2.2.4.7.2/3 missing from Part-NCO
Option 1	10-min FRF permitted for local VFR	No significant differences
Option 2	Amount of FRF specified in the AMC, not in the implementing rule (IR)	No significant differences

5.5. Comparison and conclusion

5.5.1. Comparison of options

Table 6— Overview of the scale of the impacts per criteria and option

	Option 0	***Option 1***	***Option 2***
Safety	0	0	0
Environmental	0	0	slightly +
Economic	0	0	+
GA and proportionality	0	–	+
'Better regulation' and harmonisation	0	+	+
Total	0	–/+	+

Adopting Option 2, savings are possible vs Option 0 of:

— EUR 5 million/yr when unnecessary fuel stops are avoided; and

— EUR 1.5 million/yr when the cost of carrying unnecessary reserve is avoided.

5.5.2. Sensitivity analysis

The behaviour of pilots-in-command during flight and/or in emergency situations cannot be forseen through this impact analysis. Hence, it is rather impossible to assess the impact of the assumption that the pilot will use the discretion provided by the rules only in circumstances that permit it. In practice, healthy risk aversion, as shown by experience in the pilot community, may result in smaller savings.

While the GA aircraft performance data used in this scenario and for the calculation of extra fuel used are only exemplars, it seems like a reasonable assumption that the general proportion of cost saving will be similar across the fleet — larger aircraft will be able to save more, but cost more to operate.

5.5.3. Monitoring and ex post evaluation

GA fuel exhaustion events will be monitored and their circumstances considered through the European Central Repository (ECR) for accident and incident reports in aviation.

6. References

6.1. 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)

6.2. Affected decisions

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

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

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

6.3. Reference documents

— EASA MB 04/2012, WP9a — General Aviation Roadmap, 11 December 2012

— 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 (FPFM) Manual, 1st Edition, 2015

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

— Safety Recommendation FRAN-2012-026 (BEA)